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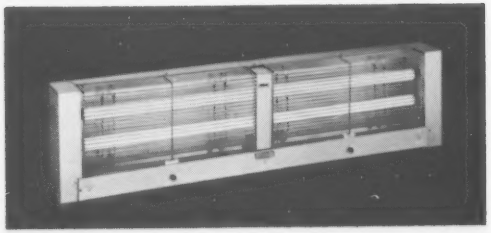

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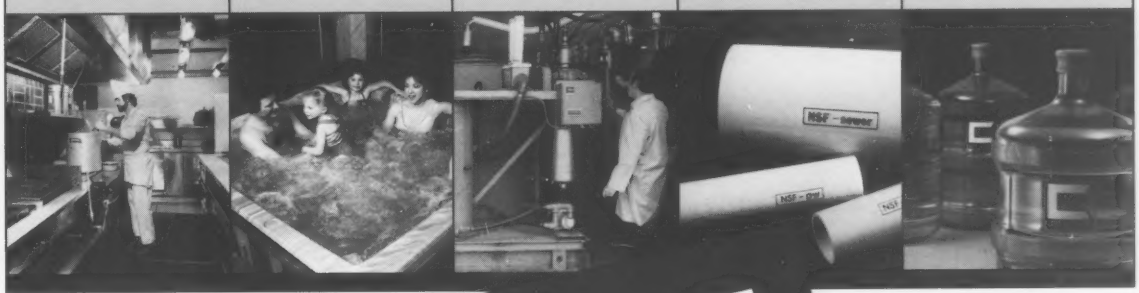

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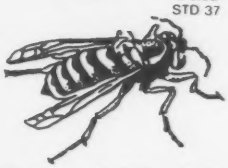

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Use of Remote Communications to Transmit Product Quality Information From Polymer-Based, Time-Temperature Indicators

A.H. Kral[1], R.R. Zall[2], and T. Prusik [3]

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This study represents the views of the authors and does not necessarily reflect the official opinion of the Department of Defense or Department of the Army.

Introduction

Use of device to monitor the temperature exposure of foods has been recognized for over 50 years. The first such device was patented in 1933 and was based on the distortion of an ice figure upon thawing (5). During World War II, the United States Quartermaster Corps monitored temperature abuse in frozen food by packing ordinary ice cubes in the secondary containers of frozen products; if the ice melted or disappeared, the product was considered to be mishandled (6). Improvements in temperature monitoring were made through the creation of specific devices that react at predetermined temperatures. These "defrost" indicators, as they are called, could actually be set to trigger at any temperature. Unfortunately, the problem with this kind of indicator is that it does not indicate how long the device was at a given temperature, nor is there any way to tell if the indicator was at a temperature higher than the preset temperature (1).

In the last 10-15 years, devices that react in relationship to both time and temperature indicators are designed with reaction rates that parallel the rate of food quality deterioration. As a result, these devices not only measure temperature exposure, but can also be used to predict product quality. An indicating device of this type is the heart of the computerized Lifelines™ Inventory Management System developed by LifeLines Technology Incorporated of Morris Plains, New Jersey.

The LifeLines System consists of a bar code label that incorporates a time-temperature, color changing polymer strip. The indicator is attached to a packaged product or shipping container and goes through an irreversible color change as a result of accumulated temperature exposure. The color change is read and stored by a portable hand-held microcomputer equipped with an optical scanning wand. To date, several studies have demonstrated the ability of the LifeLines System to measure the quality of both semi-perishable and perishable foods (4) (8) (2) and (3).

A unique feature of the LifeLines System is its ability to transmit product quality information from remote sites to a central location. This remote communications capability is accomplished through the use of a computer modem which transmit data over telephone lines to a host computer. The remote communications feature allows widely disbursed stocks to be managed by a central headquarters. This paper reports the results of a study which exercised this capability while testing the LifeLines System on subsistence (food) in military distribution. The study used two different modems; a Datec 30™ acoustic coupler, Chapel Hill, North Carolina and the more automated Smartmodem 1200™ manufactured by Hayes Microcomputer Products of Norcross, Georgia.

The acoustic coupler modem requires access to an ordinary, round handset telephone. The phone can be either a single or multiple line unit. The handset fits into special receptables in the acoustic coupler, and information is actually passed through the telephone unit itself. The acoustic coupler operates at speeds of 300 baud or bits per second.

The newer, more automated Smartmodem requires access to a single phone line that is equipped with an RJ11 modular plug. This allows the telephone line to be connected directly to the modem and information passes from the modem to the telephone network, bypassing the telephone unit itself. This modem operates at speeds of 1200 baud; four times faster than the acoustic coupler.

Materials and Methods

A total of three separate tests of the LifeLines system were conducted in this study. Specifics on the use of the time-temperature monitoring system have previously been described by other researchers (4) (8) and (7). The

first examination tested the LifeLines system on 1200 cases of frozen orange juice concentrate procured by the Department of Defense. LifeLines indicator labels were applied to the orange juice shipping containers as the product came off the manufacturer's processing line. Using the hand-held microcomputer and optical scanning wand, indicators were read during initial application and 7, 8, 39 and 53 days thereafter. All readings corresponded to times when the product was at critical junctures in the military storage and distribution chain.

Data from the indicator readings were electronically transmitted from the orange juice processing plant and military storage facility to a host computer using the LifeLines system's remote communications feature. At both the processing plant and storage facility, the hand-held microcomputer and a Datec 30™ acoustic coupler modem were used to transmit data to Cornell University in Ithaca, New York. The data were received by Smartmodem 1200™ and transferred to an IBM PC/XT microcomputer which was operating HCOM7, the LifeLines communications software. The distance between the remote sites and Cornell University was approximately 300 miles.

The second examination involved testing the LifeLines System on 213 cases of fresh produce. The produce was obtained by government purchasing agents at the Hunts Point Terminal Market in Bronx, New York. LifeLines indicator labels were applied and read at the terminal market, soon after the produce was purchased. Indicator readings were also taken 12, 25 and 108 hours after label application; coinciding with the movement of the produce through critical points in the distribution system.

Information from the indicator readings was transmitted from Cornell University, using a hand-held microcomputer and Smartmodem 1200™, to Allied Corporation, the data were received by a Smartmodem 1200™ and transferred to an IBM PC/XT microcomputer operating HCOM7 communications software.

The third examination tested LifeLines indicators on 378 cases of fresh produce procured at the Hunts Point Terminal Market. As in the previous produce test, LifeLine indicator labels were applied and read shortly after the produce had been purchased by government procurement agents. Subsequent readings were taken 14 and 28 hours after the initial reading.

Data from the initial and 14 hour readings were transmitted from Allied Corporation to Cornell University. At Allied Corporation, a hand-held microcomputer and a Smartmodem 1200™ were used to transmit data. At Cornell University, the data were received by a Smartmodem 1200™ and transferred to an IBM PC/XT.

Information from the 28 hours scan was transmitted from Cornell University to Allied Corporation. A handheld microcomputer and a Datec 30™ modem transmitted information from Cornell University to Allied Corporation. The data were received by a Smartmodem 1200™ and transferred to an IBM PC/XT personal computer.

Results and Discussion

In the frozen orange juice concentrate test, the Datec 30™ acoustic coupler modem was used because neither the juice processor, nor the military storage facility possessed the type of telephone line required by the Smartmodem 1200™. Transmission of indicator readings from the processing plant to Cornell University occurred without incident, however, when transmitting data from the military storage facility, failures occurred in two out of three trials.

Communication failures were linked to noise caused by loud conversation and unintentional physical contact with the Datec 30™ modem. Since the acoustic coupler operates by sending electronic signals through the telephone handset, transmissions were very susceptible to disruption by background noises. Disturbances caused by tapping the modem, or high level noise impulses from loud talking, hand clapping or door slamming mix with normal electronic tones and generate a data error which can abort the transmission. The slow speed of data transmission, 300 baud, coupled with a large amount of transmitted information can extend the "window of opportunity" for background disturbances to cause data errors. Successful use of the acoustic coupler requires that special effort be made to ensure a noise-free environment during remote communication. A summary of the data transmitted in the orange juice test in located in Table 1.

In the produce tests, the lack of a required telephone line meant that communication initiated by the Smartmodem 1200™ was limited to transmissions between Cornell University and Allied Corporation, where a single telephone line with RJ11 modular plug existed. In this case, transmission of data was successful and occurred without failure. Since the modem is connected directly to the telephone network, background noises have no adverse effect on communications. Intentional background disturbances, caused by a slamming door and tapping the modem, failed to cause data errors or an aborted transmission.

Similar results for both the Datec 30™ acoustic coupler and Smartmodem 1200™ were experienced when transmitting information from the final produce test. In this case, both types of modems were used to transmit data between Cornell University and Allied Corporations.

This study demonstrated that both the Datec 30™ acoustic coupler and the Smartmodem 1200™ could successfully transmit indicator readings from remote areas to a central location. However, the lower error rate and faster transmission speed of the Smartmodem 1200™ makes it the preferred modem for LifeLines remote communications.

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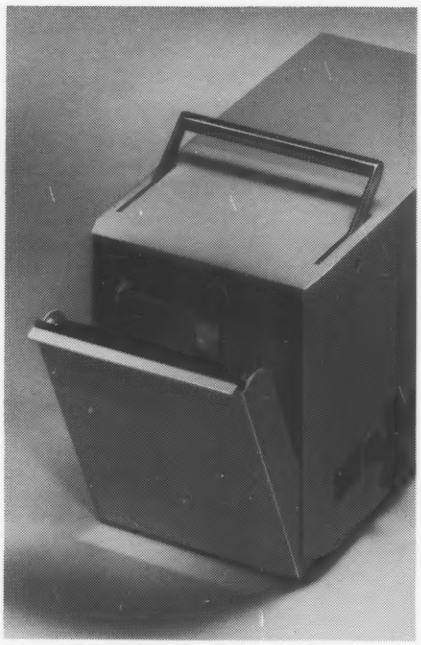

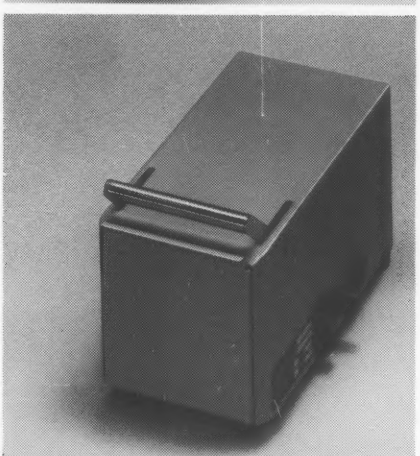

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The Scientists Tell Me . . .

Biological Control of Pests Important to Citrus Production and Marketability

by Marilyn Brown (*Reprinted from TAES Science Writer*)

Citrus culture is important to Texas and Florida, not only for the dollars and jobs it adds to the economy, but also for its healthful image in the market place. An integral part of maintaining that image is keeping the fruit healthy and free of insect pests.

"In general, most insect and mite pests of citrus attack the fruit at various stages during production, and although most don't reduce internal quality or yields significantly, they pose a threat to marketability through their physical presence or as a result of feeding damage on fruit rind," says H. W. Browning, citrus entomologist with the Texas Agricultural Experiment Station.

Citrus fruit have a lengthy maturation period - up to 12 months from bloom to harvest - giving them prolonged exposure in the field. In addition, the perennial nature of citrus orchards results in continued insect and mite pressure, with multiple generations per year of most pests.

"The development of classical biological control programs for arthropod pests in citrus takes advantage of the very feature that makes pest arthropods so serious," Browning says. Parasites and predators, like their pest hosts, can survive year-round in orchards, and the continued presence of hosts on fruit, foliage, and twigs aids in long-term survival of these natural enemies."

The permanency of orchards provides time for pest and natural enemy populations to stabilize, and without disruptions such as applications of nonspecific pesticides, pest populations can be held in check by parasites, predators, and pathogens, the researcher says.

Citrus is not native to the Southeast, and likewise, its pest complex is, for the most part, of exotic origin, Browning says. As pests have found their way into Texas and Florida from other areas of the world, natural enemies have not always followed, leaving Texas and Florida with the goal of reuniting the pests with their enemies.

Ongoing research currently is aimed at biological control of scale insects, whiteflies, weevils, mites, and fruit flies, where problems are not being resolved through other means.

"By far the greatest effort in classical biological control of citrus pests in the Southeast has been directed toward armored scales, and as a result, the number of successes is correspondingly high. The complex of scale species is rich, and each has at one time been a major threat in either Florida or Texas," Browning says.

Scale pests include the Florida red scale, California red scale, chaff scale, snow scale, Glover scale, and more recently, the black parlatoria. Scales spend most of their lives in one place, making them available targets for attack by a wide variety of predators and parasites, Browning says.

Florida red scale has ranked as one of the principle pests of citrus since the late 1950's. In 1959, a small, parasitic wasp that had successfully controlled the Florida red scale in Israel was imported into Texas. The wasp, *Aphytis holoxanthus,* originated in Hong Kong and completely controlled the pest by 1972.

"Despite this level of biological control, further outbreaks of this pest have since occurred as a result of the application of Supracide and other pesticides in the citrus system," Browning says.

Purple scale is another example of complete biological control through introduction of an exotic parasite. California red scale is now the major armored scale threat in Texas; it damages and kills young trees. Biological control has been satisfactory in only some areas. Further research is needed, Browning says, for control of red scale as well as for chaff scale.

Phytophagous mites also have cut into the citrus economy, consistently ranking high as key pests. Among the more damaging species are the rust mite, the citrus red mite, and the Texas citrus mite. Mites damage the fruit directly when feeding.

"Chemical control programs have been used successfully to reduce damage by mites in citrus, but these control strategies are both expensive and disruptive to other components of the pest complex," Browning says.

Mites have man natural predators, but the importation of exotic natural enemies has occurred mainly in Florida.

"A continuing effort is needed to identify sources of natural enemies of citrus mite pests from locations where these mite are under satisfactory biological control," Browning says. "Reliance on chemical control of mites in the southeastern citrus means higher production costs, potential for chemically induced pest upsets due to disrupted biological control, and negative environmental impacts," he says.

"The potential for improvements in fruit quality and reduction in control cost for the rust mite along justify further biological control efforts, and the risk of upsetting existing biological control in citrus would be reduced drastically through advances in biological control of the mite pest complex," he says.

"The most striking example of classical biological control of a whitefly species involved citrus blackfly in Texas and Florida," Browning says. A serious outbreak in the late 1960s threatened the future of the industry in Texas. Trees were heavily encrusted with the insect. Texas scientists borrowed from a Mexican biological control program, introducing two parasites from Mexico, and complete biological control was achieved.

"The benefit of cooperative efforts in biological control continued when the blackfly invaded Florida in 1976. Tremendous populations developed, averaging 40 to 60 blackfly nymphs per leaf, and entire orchards were blackened by copious amounts of honeydew and sooty mold fungus," the researcher say. "Despite the expenditure of about $15 million on eradication, the effort did not eliminate blackfly."

Biological control was begun during the eradication period through cooperation with Texas and Mexico. Eventually two parasite species brought the blackfly under control, at a cost of about $2.2 million, and the benefits of biological control of this pest are continuing to accrue, Browning says.

Control of the spirea aphid is another example of the importance of cooperative efforts, Browning says.

Citrus mealybug is a worldwide pest of citrus, which is kept under control in Florida by naturally occurring and introduced predators and parasites. The pest status of citrus mealybug in Texas varies, with infrequent period of population increase caused by both natural phenomena and pesticide effects.

These examples exemplify the role that classical biological control has played in pest management of citrus in the Southeast, Browning says.

"In many cases, the cost of achieving biological control was insignificant, and the returns to growers from lowered pest status are continuing to be accumulated," he says.

"The processes of foreign exploration, identification, importation, field release, and evaluation of exotic natural enemies are difficult and unpredictable, but compared with the cost of other control options, such as the development and registration of a new pesticide, the cost of this research is reasonable, and the benefit-to-cost ratio will continue to rise over a long period of time," the scientist says.

Editor's Note: Any question regarding this column should be addressed to Science Writer, Dept. of Agir. Communications, Texas A&M University, College Station, Texas 77843.

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A Study of Farm Receipts of Milkfat Using Automatic Sampling of Milk and Infra-red Analysis of Milkfat

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Introduction

Accounting for milkfat intake is an essential step in meeting marketing requirements. It is also the means by which a dairy processing operation can be monitored to determine process efficiency, i.e., the extent of losses due to processing (2, 4, 5, 9). Any attempt to monitor outgo of milkfat from a plant hinges for accuracy on the precision with which intake of milkfat is measured. In this regard, the two most common sources of variability are sampling errors and imprecision or inaccuracy in analysis.

With the Babcock method, testing variability of ± 0.10% has generally been considered acceptable for single test results and ± 0.05% for duplicates. Even application of more precise techniques has not reduced the level of variability greatly. Recent work (6) indicates a level of precision of about ± 0.08%, at 95% confidence (3). AOAC standards (1) set precision of infra-red testing of milkfat at about ± 0.04%, i.e., a standard deviation of the difference between duplicate analyses of 0.02%. Hence, testing precision has improved.

However, sampling errors remains a significant unknown factor. Not all bulk tanks necessarily produce representative samples after the minimum five full minutes of agitation for small bulk tanks and 10 minutes for 1,000 gallon or larger ones at all levels of fill. Differences of over 1.0% milkfat may be found in samples taken from different locations in the same tank (7). In addition, milk haulers do not always wait the minimum time of agitation required by regulation. And many haulers make the assumption that milk is properly agitated if they arrive at the farm within two to four hours after milking. All of these and other factors must be seen not only as sources of sampling error, but of errors of unknown magnitude. Doubtless such sources pose potential accounting problems of far greater magnitude, than testing imprecision.

For the above reasons, automatic milk sampling holds some hope for improved sampling and accounting of milkfat. Because previous work (7) had shown that automatic sampling was at least the equal of manual sampling, further evaluation was considered appropriate to delineate more precisely the level of precision in fat accounting under various testing and sampling procedures.

Materials and Methods

This study involved an evaluation of automatic vs. manual sampling using the Foss Auto Sampler (A/S N. Foss Electric, 69 Stangerupgade, Hillerod, Denmark). Samples were taken from bulk tanks of 91 producers representing 11 milk pick-up routes serving a Land O'Lakes, Inc. dairy plant. Auto-samplers (AS) were mounted on the tank truck involved in milk pick-up and also n the intake line of the dairy plant. Weight of milk received was determined both n terms of bulk tank milk receipts and scale weight readings of milk in the tank truck.

Fat content of the milk was determined by infra-red analysis (Multispec, Inc., 23560 Lyons Avenue, Newhall, CA 91321). All analyses were done in duplicate. AS samples from the bulk tanks were compared with the average of three samples taken manually at three different locations within the bulk tanks. Each sample at the plant was compared with one "manual" sample taken from the tank truck.

Results and Discussion

Table 1 shows the precision of infra-red analysis of milkfat. A total of 364 samples were analyzed, ranging in test from 3.29 to 4.78%. If the first analysis of duplicate tests is compared with the second analysis, grand average fat tests are 3.752% vs 3.749%, a difference of 0.003%. The standard deviation of the difference is 0.013%.

It is important to know what this latter value means in terms of variability in accounting for fat. This is best expressed in a value reflecting two times the original per-

centage, i.e., 2 X 0.013% = 0.026%. This percentage, then, indicates the ability of the test procedure to repeat itself, and with approximately 95% confidence.

Assume, for example, that the true fat test is 3.50%. Results of repeated infra-red testing of such milk would produce values ranging within +T10 6+T5 0.26% of that test 95 times out of 100. In other words, infra-red analysis could be expected to repeat itself and produce results falling between 3.474% and 3.526% with 95% confidence.

The above values speak only to the precision of the method, not to its accuracy. AOAC standards (1) require accuracy of about ± 0.12% at the 95% level of confidence. An evaluation of this specific potential showed agreement between infra-red and Babcock and Mojonnier tests of 0.092% and 0.088%, respectively (6). In accounting for fat using infra-red analyses, therefore, repeatability and accuracy errors could amount to nearly 0.12% of fat received by the dairy plant (0.026% + 0.092% = 0.118%).

Sampling errors may produce significantly greater variations in test results than those posed by analytical methods. Indeed, data in Table 2 indicate as much as 1.0% possible variation in manual sampling simply based upon the location within the bulk tank from which the sample is taken. In this study, samples were obtained from three different locations, and the largest difference in milkfat test on samples from one bulk tank was 1.045%. The average difference was 0.035%.

When AS samples were tested and compared with the average of tests of three samples taken manually, the difference was 0.012%, the AS results being the lower of the two. This was the finding from milkfat analyses of 273 "manual" samples and 91 "AS" samples.

The same comparison made of analyses of 11 "manual" and 11 "automatic" samples from tank trucks showed a difference of 0.013%, the AS samples again yielding the lower of the two values. Again, these are the results of averages of duplicate analyses.

Because most milkfat testing involves a single infra-red analysis, the first of the duplicate tests was used for comparison purposes. Using only one analysis the difference in milkfat test between AS and manually taken samples over all samples (both bulk tank and tank truck) was 0.003%. Although the difference is smaller than those observed for duplicate tests, the AS samples again produced the lower of the two results.

It should be emphasized at this point that the difference in test results on samples obtained under the two methods is very small, though not necessarily meaningless in large volume operations. Still, it is important to maintain perspective. This is true also of the difference found between bulk tank and tank truck test results under the two methods of sampling. These differences are also shown in Table 2. A comparison of manual methods of sampling of both farm tanks and tank trucks produced a difference between the two sources of 0.002%. The AS samples yielded a difference of 0.0007%. Agreement between bulk tank and tank truck milkfat tests, therefore, was well over two times better (2.85, by calculation) on samples taken by AS as compared to manually taken samples. The above results are generally in accord with findings of others (9).

Given the possibility that a dairy plant might use manual methods on the farm and an AS sampler at the plant, the last statistic in Table 2 is of interest. Here the results show a difference between bulk tank and tank truck samples of 0.011%, with the AS sample producing the lower test of the two. In other words, the magnitude of difference was about the same as that observed between manual and AS samples from bulk tanks and/or tank trucks.

But accounting for fat involves more than sampling and testing alone. It also involves weight of milk received and processed. Often, the difference in scale weights of empty and full milk trucks is used as a gauge in determining the relative accuracy of milk weight measurement in bulk tanks on the farms represented by a single truck load of milk. Although data in Table 3 are far from definitive in this regard, they do indicate, for whatever reason, lower weight readings of truck milk than bulk tank receipts in all but one instance. Over 11 pick-up routes, the total difference in milk weight was 995 pounds, truck weights averaging the lower of the two. This is a difference of 0.38%. Hence, scale weight of milk is at best only a gauge of gross negligence in pick-up procedures. Nevertheless, experience suggests that it is better than no monitoring at all and is, at least, a constant reminder to the milk hauler of the need to perform reasonably accurate measurements of milk in bulk tanks.

Table 4 reflects a kind of grand overview of the relative significance of various testing and sampling methods on milkfat accounting. In all cases, pounds of fat were calculated from total pounds of milk as based upon bulk tank measurements and receipts. For the 11 routes, the total weight of milk was 264,790 pounds.

First, note that averages of three manually taken samples tested in duplicate differed from a single sample tested once by 8.0 pounds of milkfat. This difference reflects bulk tank milk only, and is not a major difference in relation to the added cost of sampling and testing that the former procedures represent. A similar comparison of one AS sample tested in duplicate vs one AS sample tested singly showed a difference of 5.4 pounds of fat. Again, one analysis appears to be adequate.

If manual and AS sampling are compared, a single analysis of one sample by each method gives a difference of 17.4 pounds of fat. The latter sampling method produces the lower result. Again, this is a comparison based upon bulk tank sampling solely.

Findings in tank sampling appear to be quite similar to those of bulk tanks. That is, the difference between duplicate and single analyses of one sample by each method is small (3.4 pounds for "manual" samples, 2.8 for AS samples). A comparison of AS vs manually obtained tank truck samples showed the two sources to differ by about 35 pounds of fat overall, whether or not samples were tested singly or in duplicate. AS samples yielded lower weights in both cases.

The last section of Table 4 provides a comparison of

various sampling and testing methods of bulk tank vs tank truck samples using bulk tank milk weights by loads for calculations. Although no method showed a difference of more than 38 pounds of fat in quantities approaching 10,000 pounds in total, the best agreement between bulk tank and truck occurred when one AS sample from each source was tested either in duplicate or single analysis. The respective differences in weight of milkfat were 10.2 and 2.0 pounds for these two procedures. The net effect of AS sampling, therefore, appears to be a tightening of the potential for accounting for fat in milk.

In Summary

Accounting for milkfat received at dairy plants involves variables in both testing and sampling. Testing variability, using infra-red methods, is in the range of 0.026% in repeatability, 0.09% in accuracy (agreement with reference procedures), both at 95% confidence. In general AS samples provide for better testing agreement between bulk tank and tank truck milk than do manually derived samples. On single samples tested one time, AS samples from these two sources varied by only 2.0 pounds of fat in deliveries amounting to 264,790 pounds of milk from 11 different pick-up routes.

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Table 1. Precision of infra-red analysis of milkfat in raw milk.,

		DUPLICATE TESTS			
Number of Samples	Range in Test (%)	Grand Average Test 1(%)	Test 2(%)	Mean Diff. (%)	Std. Dev. Diff. (%)
364	3.29-4.78	3.752	3.79	0.003	0.013

Table 2. Summary of results of farm bulk tank and plant/tank milkfat tests on raw milk samples taken by manual and automatic sampler methods.

	GRAND AVERAGE TEST RESULTS (%)							DIFFERENCE		
Three Samples Same Tank[1] Manual	Farm Bulk Tank			Plant/Truck				(Plant-Farm)		
	Man.	Auto.	Diff.	Man.	Auto.	Diff.	A-M[2] 1 test	Both Man.	Both Auto.	Pl't(A)[3] Farm(M)[4]
Max. Diff. 1.045	3.756	3.744	-0.012	3.758	3.745	-0.013	-0.003	0.002	0.0007	-0.011
Min. Diff. 0.0										
Mean Diff. 0.035										

[1]Samples were taken from three different locations within the same tank after five minutes of agitation.

[2]Difference in test results between samples taken automatically (A) and manually (B), but considering only the first analysis on each sample. Samples include both farm and plant.

[3]Samples taken from the tank trunk at the plant by Auto-Sampler.

[4]Samples taken from the bulk tanks by manual methods.

Table 3. Farm milk receipts compared to truck milk recipts.

Pick-Up No.	Farm Recipts (lbs)	Truck Receipts (lbs)	Diff. Tr'k-Farm
1	27378	27200	-178
2	29611	30080	469
3	25500	25375	-125
4	25080	24920	-160
5	24113	23920	-193
6	21308	20980	-328
7	21022	20860	-162
8	21319	21200	-119
9	21004	20900	-104
10	20824	20820	- 4
11	27631	27540	- 91
Gr.Total	264,790	263,795	-995
Average	24071.81	23981.36	-90.46

Table 4. Fat accountability as related to various sampling and testing procedures.

Sampling/Testing Method		Pounds of Milkfat (1)
From Farm Bulk Tank:		
(1) Three "manual" samples, duplicate analyses		9938.7
(2) One "manual" sample, one analysis		9930.7
	Difference, (1)-(2)	8.0
(3) One "automatic" sample, duplicate analyses		9907.9
(4) One "automatic" sample, one analysis		9913.3
	Difference, (3)-(4)	-5.4
	Difference, (3)-(1)	-30.8
	Difference, (4)-(2)	-17.4
From Tank Truck:		
(5) One "manual" sample, duplicate analyses		9953.4
(6) One "manual" sample, one analysis		9950.0
	Difference (5)-(6)	3.4
(7) One "automatic" sample, duplicate analyses		9918.1
(8) One "automatic" sample, one analysis		9915.3
	Difference (7)-(8)	2.8
	Difference (7)-(5)	-35.3
	Difference (8)-(6)	-34.7
Tank Truck (Plant) Milkfat Receipts vs. Farm Bulk Tank Milkfat Receipts:		
Difference	(5)-(1)	14.7
	(5)-(2)	22.7
	(6)-(2)	19.3
	(6)-(4)	36.7
	(7)-(1)	-20.6
	(7)-(3)	10.2
	(8)-(2)	-15.4
	(8)-(4)	2.0

(1) Based upon farm bulk tank milk weight receipts over 11 separate milk pick-up routes totaling 264, 790 pounds of milk.

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Fast-Tracking the First AIDS Drug

Brad Stone, FDA Press Officer *(Reprint from October 1987/FDA Consumer)*

The drug zidovudine, brand name Retrovir (formerly called azidothymidine or AZT), was originally developed in 1964 as a potential cancer treatment, but it showed little promise for this use. Years later, a fresh look at the compound's anti-viral properties led to its becoming the first drug approved to treat AIDS - acquired immune deficiency syndrome.

Close cooperation between FDA and the drug's sponsors, Burroughs Wellcome Co. of Research Triangle Park, NC and the National Cancer Institute, helped to expedite the testing and review of zidovudine. FDA approved the drug to treat certain patients with AIDS on March 20, 1987 - within just four months of receiving a new drug application from Burroughs Wellcome.

FDA press officer Brad Stone interviewed Dr. Ellen Cooper, group leader (anti-virals) of FDA's Division of Anti-Infective Drug Products, and Dr. James Bilstad, deputy director (medical affairs) of FDA's Office of Biologics Research and Review, to trace the development and approval of this important new drug.

FDA Consumer: *Zidovudine is categorized as an anti-viral drug. What is an anti-viral drug, and how does it work in treating AIDS?*

Cooper: An anti-viral drug interferes with viral replication. Zidovudine works in part by inhibiting reverse transcriptase, an enzyme necessary for the replication of HIV (human immunodeficiency virus), the retrovirus that causes AIDS. In addition, the virus is "tricked" into incorporating zidovudine into its DNA replication chain. This action effectively aborts the virus's ability to replicate itself.

FDA Consumer: *How does zidovudine trick the virus?*

Cooper: Zidovudine's chemical structure is in some ways very similar to thymidine - one of the key nucleosides, or links, that make up the DNA genetic chain that reproduces the AIDS virus. Evidently, the AIDS virus mistakes zidovudine for real thymidine and incorporates the drug as a link on the DNA chain. While zidovudine is similar enough to thymidine to link onto one end of the chain, it lacks features that would allow other nucleosides to link on and complete the chain. In this sense, zidovudine can be seen as a deliberately defective link that preempts the virus's reproductive chain.

FDA Consumer: *How did zidovudine receive FDA approval so quickly?*

Bilstad: Because of the urgent need for effective AIDS therapies, experimental treatments for this disease receive top priority for review. NDAs (new drug applications) for drugs for diseases for which there is a satisfactory existing therapy sometimes have to wait in line for review. This is not the case with AIDS drugs - Commissioner (Frank E.) Young has determined that they are to get immediate review, and we are striving to meet that goal.

Cooper: In addition, the new drug application for zidovudine was based largely on a placebo-controlled study with which FDA staff had been quite familiar from the beginning. FDA and Burroughs Wellcome had cooperated closely from the time clinical trials began in April 1985. This cooperation was mutually beneficial as it kept both parties abreast of the other's problems, advances and needs. Since many of the details of the study were already known to FDA reviewers, it took less time to review the results than might otherwise have been the case.

FDA Consumer: *Didn't FDA do some of the preliminary research on zidovudine as a treatment for AIDS?*

Cooper: Yes. Well before Burroughs Wellcome first applied for permission to begin clinical (human) testing, the company asked Dr. Gerald Quinnan's lab at FDA's Division of Virology to test the drug in vitro (in the test tube) against the AIDS virus, because earlier animal studies conducted by the company had indicated zidovudine's high level of activity against the virus. Dr. Samuel Broder's lab at the National Cancer Institute and Dr. Dani Bolognese's lab at Duke University (in Durham, NC) did additional testing.

FDA Consumer: *Is this type of extensive cooperation and ongoing consultation between FDA and AIDS researchers*

unusual, or is it the norm for AIDS drugs?

Bilstad: Definitely the norm, FDA is eager to work whenever possible with any companies or research or academic institutions pursuing promising treatments for this disease. We encourage all companies working on AIDS therapies to communicate with us even before they apply for clinical testing, because this cooperation can be of tremendous value in expediting the review and approval processes.

Cooper: The urgency of the AIDS situation really requires close cooperation, and there has been a strong emphasis within the agency on working to streamline the process by eliminating any gaps in communication.

FDA Consumer: *What patients benefit from zidovudine, and how?*

Cooper: The AIDS patients who were shown to benefit from zidovudine in the placebo-controlled trial (which provided the definitive data on the drug's efficacy) had recovered from a recently diagnosed episode of *Pneumocystis carinii* pneumonia (the most common opportunistic infection in AIDS patients in the United States) and lacked any signs of other opportunistic infections or of Kaposi's sarcoma (a malignancy that produces lesions on the skin and other areas of the body).

In addition, certain patients with advanced AIDS-related complex (ARC) were shown t o benefit from the drug in this trial. The benefits that can be expected with zidovudine in patients with advanced disease are prolonged survival and a decrease in the severity and incidence of opportunistic infections, at least during the first four to six months of treatment. These benefits are related because AIDS patients most often die of opportunistic infections.

AIDS patients with opportunistic infections other than *Pneumocystis carinii* pneumonia were not specifically studied in the controlled trials. Monitoring of these patients in open trials, however, showed that they too benefited from the drug.

For AIDS patients without any opportunistic infections - such as patients with Kaposi's sarcoma alone, it is unclear whether the benefits of taking zidovudine outweigh the risks, and so the drug is not yet recommended for these patients. Studies are under way to determine if zidovudine would be helpful to them.

FDA Consumer: *What risks are associated with zidovudine?*

Bilstad: The drug has some significant side effects. In some patients, it can seriously inhibit the production of essential white and red blood cells. A substantial percentage of the AIDS patients received the drug need repeated blood transfusions to overcome the depletion of their red blood cells.

Overall, however, zidovudine's potential benefits clearly outweigh its risks in the patients for whom it has been approved, because it can prolong their lives.

FDA Consumer: *Are there any studies to evaluate the long-term efficacy of zidovudine in AIDS and ARC patients?*

Cooper: FDA is working with Burroughs Wellcome to follow the progress of representative groups of patients on zidovudine to determine the drug's long-term effectiveness. The company is engaged in two major studies. The first will closely monitor patients who have received zidovudine since September 1986, when it was made more widely available on an experimental basis by FDA and Burroughs Wellcome. The second study will survey the progress of 1,500 patients, most of whom first received zidovudine following its approval by FDA last March. Nurses and epidemiologists will monitor and record the data from medical charts of these patients at about a dozen treatment centers throughout the country.

Although these two studies are just getting under way, empirical data from an ongoing study of patients who were switched from placebo to zidovudine when the initial trial was ended in September 1986 indicate that the drug continues to prolong survival in these patients.

FDA Consumer: *Are these extensive post-marketing studies usual*?

Cooper: No, their degree and intensity are certainly unusual. Important questions about zidovudine remain unanswered. If we were dealing with a less severe illness that did not require such urgent action, these questions might have been resolved before the drug was approved.

Bilstad: We hope to obtain the answers to many of these questions through studies such as those described by Dr. Cooper, and also, of course, from additional clinical studies like those being conducted at NIH-sponsored AIDS Treatment Evaluation Units.

FDA Consumer: *What extra burdens are placed on medical reviewers who must analyze potential treatments for a disease like AIDS?*

Cooper: Added pressures are brought to bear because of the urgency of a situation in which there is no known treatment for a deadly disease. It is also harder to assess the effect of a given treatment when the natural history of the disease it is designed to treat is still not fully known.

The carefully controlled design of the zidovudine trial was important for allowing rapid evaluation of the drug's effect. By examining two similar groups of patients - one treated with the drug and the other given a placebo - researchers and reviewers can more readily identify the source of differences, both good and bad, they may develop in the medical status of each group's participants.

Bilstad: In the case of zidovudine's clinical trials, the fact

that 19 patients on placebo, but only patient on the drug, died in the same four- to six-month period gave us a strong early indication that the drug was effective.

FDA Consumer: *Does zidovudine's development and approval have any implications for development of other therapies?*

Cooper: While there is probably no absolute direct relationship between the development of zidovudine and other AIDS drugs that are being studied, this approval is definitely an encouraging step or drug development everywhere. For one thing, regardless of the remaining questions about its long-term efficacy and unknown side effects, the zidovudine experience demonstrates that an anti-retroviral drug can significantly alter the clinical course of this disease, even in its advanced stages. Prior to the zidovudine trial, many people felt that patients with fully developed AIDS could not be helped by an anti-viral drug.

Bilstad: Experience with zidovudine also shows that FDA, industry and other government agencies can work together quickly and effectively to develop, test and review drugs to combat AIDS.

FDA Consumer: *Are you surprised that an effective treatment for AIDS has been found so soon after the discovery of the disease?*

Cooper: Because of the tremendous amount of study and work that has gone into researching, developing and testing AIDS drugs, there was reason to hope that progress would be made. But I think everyone was surprised that a drug with such a striking impact on mortality was found so early in the development process.

FDA Consumer: *Finally, what would you tell those who are suffering from AIDS about the outlook for the future?*

Cooper: In general, the longer term outlook is encouraging. I think zidovudine and drugs like it, might inhibit but do not destroy the AIDS virus, are the first generation of anti-retrovirals. Other, more advanced classes of anti-viral drugs are being explored, which we hope will undergo clinical study in the near future. These therapies may be even more effective in inhibiting the virus.

The search for a drug that will completely eradicate the virus from the body is bound to take much longer. In the meantime, researchers are exploring drugs to boost the immune system, which in turn may strengthen the patient's ability to resist the opportunistic infections and cancers associated with the disease.

Bilstad: The attention and resources that are being brought to bear on AIDS, in both the private and public sectors, is unprecedented. We now know more about this retrovirus than we do about many other viruses that have been known for decades to cause human diseases.

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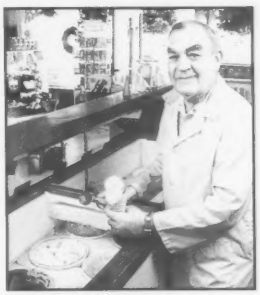

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PRELIMINARY PROGRAM
75TH ANNUAL MEETING OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS

In Cooperation with the Florida Association of Milk, Food and Environmental Sanitarians

Hyatt Regency Westshore **Tampa, Florida**

JULY 31 - AUGUST 4, 1988

Committees meet on Saturday afternoon and Sunday. You need NOT be a committee member in order to attend a committee meeting.

FRIDAY, JULY 29

8:00- 5:00	IAMFES Board Meeting

SATURDAY MORNING, JULY 30

8:00-12:00	IAMFES Board Meeting

SATURDAY AFTERNOON, JULY 30

12:30-2:00	Education and Training Committee
2:00-3:30	Dairy and Food Sanitation Committee
2:00-3:30	Water Quality and Waste Water Committee
3:30-5:00	Scientific Program Development Committee
3:30-5:00	Audio Visual Library Committee

SUNDAY, JULY 31

10:00-11:30	Dairy Quality and Safety Committee
10:00- 5:00	Communicable Disease Affecting Man Committee
12:30- 2:00	Food Service Sanitation Committee
12:30- 2:00	Affiliate Council Committee
12:30- 2:00	Baking Industry Sanitary Standards Committee
1:30- 5:00	Long Range Planning Committee
2:00- 3:30	Food Equipment Sanitary Standards Committee
2:00- 3:30	Sanitary Procedures Committee
2:00- 3:30	Applied Laboratory Methods Committee
2:00- 3:30	Foundation Fund Committee
3:30- 5:00	Retail Foods Committee
3:30- 5:00	Journal of Food Protection Committee
3:30- 5:00	Sanitation Joint Council Committee

SUNDAY EVENING, JULY 31

OPENING SESSION
Presiding: L. TOWNSEND, and
R. B. GRAVANI

7:00	WELCOME TO THE 75TH ANNUAL MEETING Leon Townsend, Dept. of Health Services, Frankfort, KY; Ronald Schmidt, University of Florida, Gainesville, FL and Robert Gravani, Cornell University, Ithaca, NY
7:20	*Ivan Parkin Lectureship - E. M. Foster, Food Research Inst., Univ. of Wisconsin-Madison, Madison, WI
8:15	Cheese and Wine Reception - Meet and greet old friends and make new ones during this diamond jubilee mixer.

THE EXHIBIT HALL WILL BE OPEN DURING THE MIXER.

*This lecture is sponsored by the IAMFES Foundation Fund.

MONDAY MORNING, AUGUST 1

7:00 **IAMFES Committee Chairperson Breakfast/Meeting**

Session: Dairy Product Protection
Chairperson: J. BOOSINGER

8:55 Door Prize

9:00 **Proposition 65 & Its Effect on the Dairy & Food Industry-**C. BRUHN, University of CA, Davis, CA

9:30 **Efficacy of High-Temperature, Short-Time Pasteurization for Inactivation of *Listeria Monocytogenes* In Milk-**J. LOVETT, J.G. Bradshaw, D.W. Francis, R.G. Crawford, C.W. Donnelly, G.K. Murthy, I.V. Wesley-FDA, University of VT, Burlington, USDA.

9:50 **Effect of High-Temperature, Short-Time Pasteurization on *Listeria Monocytogenes* in Milk-**W.H. STROUP, A.R. Prosser, J.T. Tierney, J.H. Bryner and R.W. Dickerson Jr.-FDA, Cincinnati, OH

10:10 **Growth of *Listeria Monocytogenes* at 10 Degrees C in Milk Preincubated with Selected Pseudomonads-**D.L. MARSHALL and R.H. Schmidt-University of FL, Gainesville, FL

10:30 Refreshment Break

10:45 Door Prize

10:50 **FDA Guidelines for Dairy Plant Environments-**J. KOZAK, FDA, Washington, D.C.

11:20 **Sanitary Procedures Committee Report-**D.B. Whitehead

11:30 **Behavior of *Listeria Monocytogenes* in Chocolate Milk and Ice Cream Made from Post-Expiration Date Skim Milk-**M.E. Berrang, J.F. FRANK and R.E. Brackett-University of GA, Athens, GA

11:50 **The Right-To-Know Law & How It Affects the Dairy and Food Industry-**J. THILL, Land O Lakes, Minneapolis, MN

12:20 Adjourn

Symposium: The Microbiological Safety of Fresh Processed Poultry
Co-Convenors: M.G. JOHNSON and H.S. LILLARD

8:55 Door Prize

9:00 **Welcome and Objectives-**H. LILLARD and M. JOHNSON

9:10 **What Can Be Done To Control *Salmonella* During Poultry Production?-**G.H. SNOEYENBOS, University of MA, Amherst, MA

9:25 **Colonization of Poultry By Campylobacter and the Potential for Intervention-**N. STERN, USDA/ARS, Athens, GA

10:10 Refreshment Break

10:25 Door Prize

10:30 **Factors Affecting Persistence of Salmonella During Processing of Poultry-**H. LILLARD, USDA/ARS, Athens, GA

11:00 **Chemical and Physical Treatments in Feed and Processing Waters to Reduce *Salmonella* in Processed Poultry-**A. IZAT, University of AR, Fayetteville, AR

11:30 **Persistence on and Recovery of *Listeria* from Refrigerated Processed Poultry-**G.R. Siragusa, K.J. Moore, M.G. JOHNSON, University of AR, Fayetteville, AR

12:00 Summary and Discussion

Session: Food Protection
Chairperson: R. CASE

8:55 Door Prize

9:00 **Packaged Imported Ethnic Foods-The Problems-**G.K. BROWN, FDA Baltimore, MD,

Packaged Imported Ethnic Foods-FDA's Efforts At Control-T.L. SCHWARTZ, FDA, Washington, D.C.

10:00 **Fungi Isolated from Citrus Products-**M.E. PARISH, D.P. HIGGINS, University of FL, Lake Alfred, FL

10:20 **An Update on *Aeromonas Hydrophila-***S. PALUMBO

10:50 Refreshment Break

11:05 Door Prize

11:10 **Food Equipment Sanitary Standards Committee Report-**D. SHAW

11:20 **Synthesis of Heat Shock Proteins and Thermotolerance in Bacterial Cells and Their Problems in Thermal Processing of Food-**T. TSUCHIDO, M. Takno, Osaka University, Osaka, Japan

11:40 **Baking Industry Sanitary Committee Report-**M. RONGE

11:50 **Method in Studying Flow Patterns and Residence Time Distribution of Fluids Containing Particulats-**B.B. YANG and K.R. SWARTZEL, NC State University, Raleigh, NC

12:10 Adjourn

WHO'S THE SPEAKER?
The speaker's name is set in CAPITAL LETTERS, and only thespeaker's present affiliation is listed.

MONDAY AFTERNOON, AUGUST 1

Session: Milk Quality
Co-Convenors: R. H. SCHMIDT and P.C. VASAVADA

1:25 Door Prize
1:30 **Milk Quality Improvement Programs: Are They Working?** A Panel Discussion-Panel Moderator: R.V. LECOWICH, ABC Research Corp., Panel: D.K. BANDLER, Cornell University, Ithaca, NY; D. BIGALKE, Food & Dairy Quality Mgt. Inc., St. Paul, MN, W.W. COLEMAN, MN Dept. of Agriculture, Minneapolis, MN
3:00 Refreshment Break
3:15 Door Prize
3:20 **Dairy Product Quality & Safety Committee Report**-S. T. SIMS
3:30 **Bacterial Attachment to Buna-N Gaskets in Milk Processing Equipment**-M.H. CZECHOWSKI, Diversey Corp, Wyandotte, MI
3:50 **Applied Laboratory Methods Committee Report**-H. CARR
4:00 **The PI Count - Is It Good Enough?**-J.R. BISHOP, VA Polytechnic Institute & State University, Blacksburg, VA
4:20 **Pre-Pasteurization Processing Parameters and Possible Effects on Fluid Milk Shelf Life**-R. FUQUA, R. Boling, R. Nugent, Dairymen, Inc., Louisville, KY
4:40 **The Significance of Aerial Microbiota on the Quality of Dairy Products**-K. ROSSMOORE, P. Johnson, C. Kovach, Diversey Wyandotte Corp., Wyandotte, MI
5:00 Adjourn

Session: Food Service Sanitation
Chairperson: C.D. CLINGMAN

1:25 Door Prize
1:30 **Utilizing Personal Computers for Food Service Inspections & Telecommunications**-T. CHESTNUT, Red Lobster Inns, Orlando, FL
2:00 **Food Service Sanitation Committee Report**-B. ARMSTRONG
2:10 **Computerization of Food Service Inspections**-R. SWENSON, Oregon Digital Systems, Inc., Corvalis, OR
2:40 **Communicable Diseases Committee Report**-F.L. BRYAN
2:50 **Use of Field Computers for State Food Service, Regulatory Food Service Inspections and Dairy Farm Inspections**-R.W. PETERSON, USPHS, FDA, Denver, CO
3:10 Refreshment Break
3:25 Door Prize
3:30 **Food Safety in Soup Kitchens in New York State**-P.M. MORRIS, and R.B. Gravani, Cornell University, Ithaca, NY
3:50 **Effectiveness of Cold-Serving Units in Foodservice Operations As Determined By Time-Temperature Patterns and Bacterial Counts**-A.M. FRASER, C.A. Sawyer, Michigan State University, East Lansing, MI
4:10 **A History & Update on Foodborne Outbreaks in the Airline Catetering Industry**-U. ESEN, United Airlines, Inc., Flushing, NY
4:40 Adjourn

Symposium: The Future of Water Quality & Its Affect On The Dairy & Food Industry
Chairpersons: R.R. ZALL, and R.E. CARAWAN

1:25 Door Prize
1:30 **Emerging Water Quality Issues and There Impact on the Dairy and Food Industry**-P. BRUNS, Nabisco Brands Inc., East Townover, NJ
2:00 **Analysis of a Water Surveillance Program**-P. W. HESS, Hershey Foods Corp., Hershey, PA
2:30 **Concerns About Pesticide Residues in Water**-T. D. TRAUTMAN, General Mills Inc., Minneapolis, MN
3:00 Refreshment Break
3:15 Door Prize
3:20 **An Update on EPA Water Quality Standards**-A. M. KUZMACK, EPA, Washington, DC
3:50 **Water Quality for Processing Plants**-J.G. ARBUCKLE, ESQ, Patton, Boggs and Blow Assoc., Washington, DC
4:20 **Panel Discussion**
4:40 **Water Quality and Waste Water Committee Report**-R. R. ZALL
Quality Committee
4:50 Adjourn

Session: Food Microbiology
Chairpersons: R.B. GRAVANI and D.A. GABIS

1:25 Door Prize
1:30 **Comparison of Ten Media for Enumeration of *Listeria Monocytogenes* in Oysters and Country-, and Dry-Cured Hams**-P.K. CASIDAY, R.E. Brackett, L.R. Beuchat, University of GA, Griffin, GA
1:50 **The Effects of Modified Atmosphere Storage on Growth of *Listeria Monocytogenes* and *Aeromonas Hydrophila* on Fresh Broccoli**-M.E. BERRANGE, R.E. Brackett, and L.R. Beauchat, University of GA, Griffin, GA
2:10 **Survival of *Listeria Monocytogenes* in Ground Beef or Liver During Storage at 4° and 25°C**-L.A. SHELEF, L.A. Monte, Ayne State University, Detroit, MI
2:30 **A Modified Plating Technique for Enumeration of Stressed Salmonella**-A.A. AIROLDI*, E.A. Zottola, University of MN, St. Paul, MN
2:50 **Evaluation of a DNA Hybridization Method for the Detection of Salmonella in Processed Egg Products**-M.A. MOZOLA, D.P. Attwood, T.M. Jones, Gene Trak Systems, Framingham, MA
3:10 Refreshment Break
3:25 Door Prize
3:30 **Isolation of *E. Coli* 0157:H7 From Foods Through the Use of Monoclonal Antibodies**-E. TODD, R. Szabo, P. Peterkin, D.R. Bundle, M. Gidney, Health and Welfare Canada, Ottawa, National Research Council, Ottawa
3:50 **Survival and Growth of *Aeromonas Hydrophila, Vibrio Parahaemolyticus*, and *Staphylococcus Aureus* on Cooked Mince and Surimis Made from Atlantic Pollock**-S.C. INGHAM, N.N. Potter, Cornell University, Ithaca, NY
4:10 **Lethality of Modified Atmospheres to *Campylobacter Jejuni* in Turkey Roll**-F.A. DRAUGHON, R. Phebus, B. Lee, University of Tennessee, Knoxville, TN
4:30 **Influence of Modified Atmosphere Packaging on the Microflora and Quality of Fresh Bell Peppers**-R.E. BRACKETT, University of GA, Griffin, GA
4:50 Adjourn

TUESDAY MORNING, AUGUST 2

Symposium: The Handling and Safety of Ingredients Used in Dairy Products
Chairperson: G. PRINCE

8:25 Door Prize

8:30 **FDA Concerns with the Safety of Dairy Products**-J.G. NICHOLS, USFDA, Washington, DC

9:00 **An Update on Microbiological Concerns of FDA**-J.E. KVENBERG, USFDA, Washington, DC

9:30 **An Industry Reaction to Dairy Product Safety Concerns**-G.P. WITTE, Milk Ind Foundation & Internat'l Ice Cream Assoc., Washington, DC

10:00 Refreshment Break

10:15 Door Prize

10:20 **Ingredient Specifications From a Suppliers Viewpoint**-G.C. KIVI, Fantasy Flavors Incorp., Wheaton, IL

10:45 **In Process Tracking System For Ingredients**-Speaker to be announced in final program

11:05 **Ingredient Supplier Approval Programs**-Speaker to be announced in final program

11:25 **Environmental Concerns in Handling Ingredients**-D.A. GABIS, Silliker Lab. Inc., IL

11:50 Discussion & Summary

12:00 Adjourn

Symposium: The Safety of Extended Shelf life Refrigerated Foods
Chairperson: E.A. ZOTTOLA and R.V. LECOWICH

8:25 Door Prize

8:30 Welcome and Introduction

8:40 **Interaction of Factors to Control Microbial Spoilage of Refrigerated Foods**-D. BERNARD, V. Scott, National Food Processors Assoc., Washington, D.C.

9:15 **Good Manufacturing Practices for Refrigerated Foods**-L. MOBERG, General Mills, Minneapolis, MN

10:00 Refreshment Break

10:15 Door Prize

10:20 **Meat and Poultry Proudcts**-P. WEINER, Bill-Mar Foods, Inc., Zeeland, MI

11:00 **Microbiology and Quality Control of Frozen Thawed Meal Components**-R. PEDRAJA, Sara Lee Corp., Deerfield, IL

11:45 Summary and Discussion

12:00 Adjourn

Symposium: Environmental Health Responses To Disasters
Chairperson: S. HIBBERD

8:25 Door Prize

8:30 **Industry Perspective on Handling Chemical Emergencies**-J. BURNSIDE, Dow Chemical Co., Midland, MI

9:30 **Health Dept. Response To Chemical Emergencies**-D. MERK, Dept. of Health Services, San Diego, CA

10:15 Refreshment Break

10:30 Door Prize

10:35 **Response To Natural Disasters**-Speaker to be announced in final program

11:20 Summary and Discussion

11:40 Adjourn

WHO'S THE SPEAKER?
The speaker's name is set in CAPITAL LETTERS, and only the speaker's present affiliation is listed.

TUESDAY AFTERNOON & EVENING, AUGUST 2

Session: IAMFES Business Meeting

1:25 Door Prize

1:30 **Welcome & Introduction**-R.B. GRAVANI

1:40 **Presidential Address**-L. TOWNSEND

2:00 **Business Meeting**-L. TOWNSEND, Presiding
- •Moment of Silence for Departed Assoc Members
- •Report of IAMFES Secretary, B. SANDERS
- •Report of Executive Manager, K.R. HATHAWAY
- •Report of Affiliate Council, W.W. COLEMAN
- •Foundation Fund, H. HAVERLAND
- •Dairy & Food Sanitation Management Committee Report, H. BENGSCH
- •Journal of Food Protection Management Committee Report, R. MARHSALL
- •Audio Visual Library Management Committee Report, S. BARNARD
- •Old Business
- •New Business
- •Resolutions, R. GINN

3:00 Refreshment Break

Session: Dairy Microbiology
Chairperson: R.E. GINN

3:15 Door Prize

3:20 **Identification of Microorganisms Isolated From Sweet Water and Glycol Cooling Systems in Dairy Plants**-B.J. OVERDAHL, E.A. Zottola, University of MN, St. Paul, MN

3:40 **A Rapid Procedure for Detection of *Salmonella* In Raw Milk**-S.K. Frank, P.J. Whalen, K.M. SHAHANI, M. Gershman, University of NE, Lincoln, NE

4:00 **Effect of Abbreviated Selective Enrichment and of Post Enrichment on the Recovery of *Salmonella* Spp. from Nonfat Dry Milk**-G. ALLEN, F.B. Satchell, W.H. Andrews, V.R. Bruce, FDA Washington, DC

4:20 **A Procedure for the Direct Microscopic Count of Bacteria in Nonfat Dry Milk**-C.N. HUHTANEN, C.O. Jones, USDA, ARS, Philadelphia, PA

4:40 **Detection of Antibiotic Resistant Bacteria in Commercial Milk in Hermosillo, Mexico**-D.C. DE AQUAYO MARTHA, L.D. Berenice, M. De Oca C. Francisco, Centro De Investigacion En Alimentacion Y Desarrollo, Sonora, Mexico

Session: Food Protection
Chairperson: A. OLINGER

3:15 Door Prize

3:20 **Microbe Control and Shelf Life of Processed Meat Items**-V.J. DEL GIUDICE, Del Giudice and Associates, Inc., Chicago, IL

3:40 **Sublethal Effect of Gamma Irradiation on *Salmonella* and *E. Coli***-F. BOZOGLU, A. Caner, Middle East Technical University, Ankara-Turkey

4:00 **Incidence of Antibiotics in Meat Samples Purchased in Hermosillo, Mexico**-L. VAZQUEZ-MORENO, M.C. Bermudez, I. Higuera, Centro De Investigacion En Alimentacion Y Desarrollo, Hermossillo, Mexico

4:20 Adjourn

Symposium: Hazard Analysis Critical Control Point (HACCP)
Chairperson: F.L. BRYAN

3:15 Door Prize

3:20 **Hazard Analysis Critical Control Points (HACCP) Concept**-F.L. BRYAN, Food Safety Consultation and Training, Tucker, GA

3:35 **HACCP Systems for Meat and Meat Product Operations**-R.B. TOMPKIN, Swift-Eckerich, Inc., Oakbrook, IL

4:10 **HACCP Systems for Milk & Product Operations**-P. CRAIN, Carnation Co. Inc., Los Angeles, CA

4:45 **HACCP Systems for Retail and Restaurant Operations**-F.L. BRYAN, Food Safety Consultation and Training, Tucker, GA

5:20 Discussion

Tuesday Evening, August 2
Session: Cracker Barrel

7:30-9:00 **Demonstration of High Temperature, Short-time Equipment**-A. VOTION and J. PARK, Texas Dept. of Health, Austin, TX

WHO'S THE SPEAKER?

The Speaker's name is set in CAPITAL LETTERS, and only the speaker's present affiliation is listed.

WEDNESDAY MORNING, AUGUST 3

Session: Dairy Product Sanitation
Co-Convenors: R. SANDERS and S. GAMBREL

8:25 Door Prize
8:30 **The Statistical Evaluation of Milk Component Analysis**-R.E. GINN, Dairy Quality Control Institute, St. Paul, MN
9:00 **Evaluation of Raw Milk Quality by the Wisconsin Mastitis Test and Catalase Activity**-K.K. JOHNSON and P.C. Vasavada, University of WI, River Falls, WI
9:20 **Determination of Sulfonamides Residue in Milk by HPLC-UV and GC-MS**-E. ZOMER, S.E. Charm, Penicillin Assays, Malden, MA
9:40 **New Sanitation for Soft-Serve Frozen Foods**-M.L. SPECK, R.B. Redfern, R.E. Carawan, Webb Technical Group, Raleigh, NC
10:00 Refreshment Break
10:15 Door Prize
10:20 **Is There A Need for Mandatory Pasteurization of Milk for Cheesemaking?**-J.H. NELSON, Food Research Inst., University of WI, Glenview, WI
10:50 **Evaluation and Control of Microbiological Contamination of Conveyor Lubricants**-K. ROSSMOORE, Diversey Wyandotte Corp., Wyandotte, MI
11:10 **3A Committee Report**-W. CLARK
11:20 **Modelling of Salt Transfer During Brining of Feta Cheese and Determination of Diffusion Coefficient**-G. GENCER*, T. TURHAN, Middle East Technical University, Ankara-Turkey
11:40 **A Comparative Study on the Production of a White Cheese-Substitute from Soymilk and Soymilk Bovine Milk Mixtures**-Z. OGEL, F. YILDIZ, Middle East Technical University, Ankara-Turkey
12:00 Adjourn

Symposium: Current Perspectives on Seafood Sanitation
Chairperson: W.S. OTWELL

8:25 Door Prize
8:30 **An Overview of Emerging Pathogens Associated with Seafood and their Significance**-J. KVENBERG, FDA, Washington, DC
8:55 **Vibrio in Shellfish**-G. RODRICK, University of FL, Gainesville, FL
9:15 **Listeria in Seafood**-R. NICKELSEN, Appl. Microbiological Services, Inc., College Station, TX
9:40 Break
9:55 Door Prize
10:00 **Role of Oxidants (ie. Cholorine, Ozone) in Pathogen Control in Seafoods**-W. BLOGOSLAWSKI, NOAA/NMFS, Milford, CT
10:25 **Role of Acidulant (Lactic Acid) in Pathogen Control in Seafoods**-G. VREEMAN, Purac Corp., Arlington Heights, IL
10:50 **HACCP Approaches in Seafood Inspection**-S. GARRETT, NOAA/NMFS, Pascagoula, MS
11:10 Discussion, Questions and Answers
11:30 Adjourn

Symposium: An Update On Pest Problems, Strategies and New Control Technologies for the Food Industry
Co-Convenors: R.J. BRENNER and R.H. SCHMIDT

8:25 Door Prize
8:30 **Significance of Cockroach Infestations To Human Health**-R. BRENNER, USDA-ARS, Gainesville, FL
8:55 **Insecticide Resistance in the German Cockroach**-D. COCHRAN, Entomology Dept. VPI & SU, Blacksburg, VA
9:15 **Cockroach Pest Management Strategies for Food-Handling Establishments**-W. CURRIE, Environmental Protection Agency, Arlington, VA
9:40 Refreshment Break
9:55 Door Prize
10:00 **Insect Growth Regulators and Fumigation for Suppression of German Cockroaches**-P. KOEHLER, University of FL, Gainesville, FL
10:25 **Novel Baits and Role of Repellents for Cockroach Population Management**-R. PATTERSON, USDA-ARS, Gainesville, FL
10:50 **Pest Elimination - An Alternative to Traditional Pest Control**-R. PIERCE, Pierce Service, Gainesville, FL
11:10 Discussion, Questions and Answers

WHO'S THE SPEAKER
The speaker's name is set in CAPITAL LETTERS, and only the speaker's present affiliation is listed.

WEDNESDAY AFTERNOON, AUGUST 3

11:30 Adjourn

Symposium: Dairy Product Pathogen Update
Chairpersons: A. HUGGINS & W.W. COLEMAN
(Speakers to be announced in final program)

1:25 Door Prize

Several eminent microbiologists will present an update on Food Pathogen research and the implications for the Dairy and Food Industry.

Session: Food Protection
Chairperson: H.M. WEHR

1:25 Door Prize

1:30 **What's Happening With Food Irradiation?**
•**Regulatory** - M. RHODES, FL Dept. of Agriculture

2:00 •**Industry** -G. GIDDINGS, Food Irradiation Consultant, Rockaway, NJ

2:30 **Education and Training Committee Report**-W.J. SIMPSON

2:40 **Monitoring A Retail Food Store Deli Using Hazard Analysis Critical Point System**-J. FARQUAHR, Food Marketing Institute, Washington, DC

3:00 Refreshment Break

3:15 Door Prize

3:20 **Unicode Update**-T. SCHWARTZ, FDA, Washington, DC

3:50 **Retail Food Committee Report**-T. SCHWARTZ

4:00 **HACCP Analysis of Convenience Store Operations: Microbial Evaluation of Roast Beef Sandwich Production**-N.L. BURCH, C.A. Sawyer, Central Michigan Univ., Michigan State University, MT. Pleasant, MI

4:20 Adjourn

Session: Environmental Protection Session
Chairperson: S. HIBBERD

1:25 Door Prize

1:30 **Indoor Air Problems -"Sick Building Syndrome"**-M. SHER, Seminole, FL

2:00 **Hot Tubs & Health Concerns**-E. MOODE, Yale University, New Haven, CT

2:30 **Coordinating A Hazardous Materials Collection Day**-D. DUXBURY, Tufts University, Medford, MA

3:00 Refreshment Break

3:15 Door Prize

3:20 **Biomonitoring of Waste Effluents - An Overview for Environmental Sanitarians**-H.C. EMERY, US Army Biomedical Research and Dev. Lab. Frederick, MD

3:40 Adjourn

THURSDAY, AUGUST 4

10:00-4:00 **NCMIS Regional Meeting**

WHO'S THE SPEAKER?
The speaker's name is set in CAPITAL LETTERS, and only the speaker's present affiliation is listed.

SPOUSE/FRIEND ACTIVITIES

SUNDAY - JULY 31

8:00-10:00	Early Bird Reception - Cheese & Wine

MONDAY - AUGUST 1
EVENING

6:00-10:00	Gasparilla Celebration

WEDNESDAY - AUGUST 3
EVENING

6:00-7:00	Reception
7:00	Annual Awards Banquet

SPECIAL EVENTS PROGRAM

(more detailed information on page 198)

MONDAY - AUGUST 1

9:30-3:30	Tampa By The Bay Tour

WEDNESDAY - AUGUST 3

9:30-4:30	A Day of Adventure at Busch Gardens

THURSDAY and FRIDAY - AUGUST 4 & 5

Disney World Packages

INVITED GUESTS

MONDAY MORNING - AUGUST 1

7:00	IAMFES Committee Chairperson Breakfast Meeting

TUESDAY EVENING - AUGUST 2

5:00-6:00	Presidential Reception
7:00	Past President's Dinner

ADVANCED REGISTRATION FEES

Date	Registration	IAMFES MEMBER	SPOUSE/GUEST (not company representative)	STUDENT	NON-MEMBER	*Registration & IAMFES Membership for 1989 BEST BUY	
7/31	Early Bird Reception	☐FREE	☐FREE	☐FREE	☐FREE	☐FREE	Indicate Attendance
8/1	Gasparilla Celebration	☐$29	☐$29	☐$29	☐$29	☐$29	Children 12 & under No._____ ☐$13.50 each
8/3	Banquet & Reception	☐$23	☐$23	☐$23	☐$23	☐$23	Children 12 & under No._____ ☐$11.50 each

*Includes Dairy and Food Sanitation

NOTE: Prices listed are for mail registration postmarked by June 15, 1988. Registration and Functions after June 15 are $5.00 higher for each registration and each function.

REGISTRATION TIMES

Sunday, July 31	NOON - 6:00 P.M.
Monday, August 1	7:30 A.M. - 3:00 P.M.
Tuesday, August 2	8:00 A.M. - 3:00 P.M.
Wednesday, August 3	8:00 A.M. - Noon

Tabletop Display Hours

Set-up	Sunday, July 31	Noon-5 p.m.
Open	Sunday, July 31	8-10 p.m.
	Monday, Aug. 1	8-9 a.m.; 11:30 a.m.-1:30 p.m. and during a.m. & p.m. refreshment breaks
	Tuesday, Aug. 2	11:30 a.m.-1:30 p.m. and during a.m. & p.m. refreshment breaks
	Wednesday, Aug. 3	11:30 a.m.-1:30 p.m. and during a.m. refreshment break
Tear-Down	Wednesday, Aug. 3	1:30 p.m. (not before)

EXHIBITORS
(As of April 1, 1988)

Nasco ..... Fort Atkinson, WI
Dr. R.H. Ellinger & Associates, Ltd. ..... Northbrook, IL
Oregon Digital Systems, Inc. ..... Corvallis, OR
Educational Testing Service ..... Princeton, NJ
Deibel Laboratories, Inc. ..... Madison, WI
Capitol Vial ..... Fonda, NY
Foss Food Technology Corp ..... Eden Prairie, MN
3M/Health Care Exhibits ..... St. Paul, MN
Norton Performance Plastics ..... Akron, OH
Swagelok Co ..... Solon, OH
SmithKline Animal Health Products .... West Chester, PA
Natl Automatic Merchandising Assoc ..... Chicago, IL
Sparta Brush Co., Inc. ..... Sparta, WI
Reitman Mfg. Co. ..... Oakland, CA
Difco Laboratories ..... Detroit, MI
BBL Microbiology Systems ..... Cockeysville, MD
Klenzade/Div of Ecolab Inc. ..... St. Paul, MN
Gene-Trak Systems ..... Framingham, MA
Environmental Test Systems, Inc. ..... Elkhart, IN
Walker Stainless Equipment Co., Inc. .... New Lisbon, WI
Kirkegaard & Perry Labs ..... Gaithersburg, MD
Aquafine Corp ..... Valencia, CA
Control One Inc. ..... Old Greenwich, CT
ABC Research Corp ..... Gainesville, FL
Maag Agrochemicals Inc. ..... Vero Beach, FL
Organon Teknika ..... Durham, NC
Oxoid U.S.A., Inc. ..... Columbia, MD
DTR ..... Modesto, CA

Program Committee

IAMFES Chairperson: ..... Robert Gravani

Program Coordinator: ..... Ron Schmidt

Local Arrangements Committee

Local Arrangements ..... Ron Schmidt
Chairpersons Committee ..... Ron Schmidt
..... J.F. Jolley
Registration ..... James L. Strange
..... Marion Ryan
..... William Thornhill
..... Katie Kaufman
..... Oliver Kaufman
..... Dr. & Mrs. John Benson
Early Bird Reception ..... R.F. Jolley
Refreshment Breaks ..... P.S. Patel
Special Events ..... Sonya Gambrel
..... Kevin Quinn
..... C. Dee Clingman
..... Richard B. Ellis
Facilities ..... D.L. Marshall
..... Janis Ferguson
..... Jeanie Porter
..... Gary Rodrick
75th Anniversary ..... Isabel Wolf
Past Presidents Dinner ..... Oliver Kaufman
..... Guadalupe Loza
Door Prize ..... John Benson
Finance ..... Ken J. Crothers
..... J.J. Jezeski
..... Chester Marsh
..... Keith Pardue
..... R.F. Jolley
Hospitality Room ..... Katie Kaufman

IAMFES Executive Board

President: Leon Townsend, Frankfort, KY
President Elect: Robert Gravani, Ithaca, NY
Vice President: Ron Case, Glenview, IL
Secretary: Robert Sanders, Washington, DC
Past President: Roy Ginn, St. Paul, MN
Affiliate Council Chrpn: William Coleman, St. Paul, MN
Executive Manager: Kathy R. Hathaway, Ames, IA

Journal of Food Protection

Editor: Dr. Lloyd B. Bullerman, Lincoln, NE
Managing Editor: Kathy R. Hathaway, Ames, IA
Technical Editor: Dolores Taylor, Ames, IA

Dairy and Food Sanitation

Editor: Kathy R. Hathaway, Ames, IA
Associate Editor: Margie Marble, Ames, IA
Technical Editor: Dr. Henry V. Atherton, Burlington, VT

Affiliate Officers

Chairperson ..... William Coleman
Secretary ..... Lloyd Luedecke

Florida Association of Milk, Food and Environmental Sanitarians, Inc.

President ..... O.W. Kaufmann
Past President ..... R.F. Jolley
President Elect ..... R.H. Schmidt
Sec'y/Treasurer ..... F. Barber

SPECIAL THANKS TO THE
Florida Association of Milk, Food and Environmental Sanitarians
The Florida Local Arrangements Committee

IAMFES

MEETING REGISTRATION FORM

75th IAMFES Annual Conference
July 31 - August 4, 1988
Hyatt Regency Westshore
Tampa, Florida

QUESTIONS:
Call 800-525-5223
or 515-232-6699

NOTE: PRICES LISTED ARE FOR *MAIL REGISTRATION POSTMARKED BY JUNE 15, 1988.*

REGISTRATION AND FUNCTIONS AFTER JUNE 15 ARE $5.00 HIGHER FOR EACH REGISTRATION AND EACH FUNCTION

NAME _____ COMPANY NAME _____

ADDRESS _____ CITY _____ STATE/PROVINCE _____

COUNTRY _____ ZIP _____ JOB TITLE _____

OFFICE PHONE # _____ IF STUDENT, COLLEGE OR UNIV. _____

COMPANIONS (spouse/children) _____ _____

_____ _____

PLEASE CHECK where applicable

IAMFES MEMBER _____
NON-MEMBER _____
AFFILIATE MEMBER *ONLY* _____
STUDENT _____
30 or 50 Year Member _____
AFFILIATE DELEGATE _____
EXECUTIVE BOARD _____
PAST PRESIDENT _____
SPEAKER _____

PRICES GOOD WHEN POSTMARKED BY JUNE 15, 1988
Prices after June 15 are $5.00 higher for each registration and each function. Registrations postmarked after June 15 must include higher prices.

SECTION 1

		IAMFES MEMBER	SPOUSE/GUEST (not company representative)	STUDENT	NON-MEMBER	*Registration & IAMFES Membership for 1989 BEST BUY	
Date	Registration	☐$45	☐$15	☐$10	☐$75	☐$83	
7-31	Early Bird Reception	☐FREE	☐FREE	☐FREE	☐FREE	☐FREE	
8-1	Gasparilla Celebration	☐$29	☐$29	☐$29	☐$29	☐$29	Children 12 & under No._____ ☐$13.50 each
8-3	Banquet & Reception	☐$23	☐$23	☐$23	☐$23	☐$23	Children 12 & under No._____ ☐$11.50 each

*Includes Dairy and Food Sanitation

SECTION 2

— SPECIAL EVENTS —

Choose the events you wish to attend and include with your registration form above - see next page

	DAY/DATE	ADULTS	CHILDREN	How Many
Tampa by the Bay Tour	Mon. 8-1	$25.00	$12.50 (12 and under)	_____Children _____Adult
Adventure at Busch Gardens	Wed. 8-3	$25.00	$ 4.00 (2 and under)	_____Children _____Adult
Disney World Package	Thurs. 8-4 Fri. 8-5	☐ PLEASE CHECK IF INTERESTED AND YOU'LL BE CONTACTED.		

Make Checks Payable to:
IAMFES 1988 Meeting Fund
U.S. FUNDS ONLY

Mail by June 15, 1988 to:
James L. Strange
FL Dept. of Agr. & Cons. Serv.
3125 Conner Blvd.
Tallahassee, FL 32399-1650
Phone:904-487-1480

Total of Section 1 $ _____
Total of Section 2 $ _____
Overall Total $ _____

IAMFES

Special Events Program

TAMPA BY THE BAY TOUR
August 1, Monday
9:30 a.m. - 3:30 p.m.

A guided bus tour of historical Tampa, FL. Visit the University of Tampa campus including the lovely H. B. Plant Museum which was once the lavish Tampa Bay Hotel built in 1890. Shop at Hyde Park in the restored area, drive along Bayshore Blvd. where some of Tampa's finest old mansions are located. Lunch at the Colannade Restaurant over-looking the water. Browse the marketplace at Harbour Island and finally visit Ybor City, Tampa's famous Latin quarter. Here you visit historic Ybor Square located in a cigar factory built in 1886. There will be ample time for shopping in the quaint shops and you will view cigars being handrolled. Cost: Adults $25.00; Children (12 and under) $12.50.

A DAY OF ADVENTURE AT BUSCH GARDENS
August 3, Wednesday
9:30 a.m. - 4:30 p.m.

Spend the day at Busch Gardens, The Dark Continent. Visit the fourth largest zoo in the United States, the amusement park, nature shows, and all Busch Gardens has to offer. Including Lunch at the park. Cost: Adults $25.00; Children (2 and under) $4.00.

DISNEY WORLD PACKAGES
August 4 & 5, Thursday and Friday

For those interested, 2 or 3 day post-meeting Disney World packages will be arranged by Around the Town Travel Agency, Tampa, FL. Typical packages will include transportation, park admission, and lodging at special rates. Arrangements must be confirmed no later than June 30, 1988.

SOCIAL EVENTS THROUGHOUT THE MEETING

Cheese & Wine Reception with Exhibits, Sunday Evening
Gasparilla Festival, Monday Evening
Awards Banquet & Reception, Wednesday Evening

Make Your Reservations Early!

Hotel Reservations

IAMFES

75th Annual Meeting
July 31 - August 4, 1988
Hyatt Regency Westshore
6200 Courtney Campbell Causeway
Tampa, FL 33607

The Florida Association of Milk, Food and Environmental Sanitarians (FAMFES) will be hosting the 75th IAMFES Meeting, July 31 - August 4, 1988. They cordially invite you to participate in the educational sessions as well as in social functions and special events with old or new colleagues and friends, view the table top exhibits, and enjoy Florida hospitality at the Hyatt Regency Westshore, uniquely located in a 35 acre nature preserve on beautiful Tampa Bay.

MAIL THIS FORM DIRECTLY TO:

HYATT REGENCY WESTSHORE
IAMFES MEETING
6200 Courtney Campbell Causeway
Tampa, FL 33607

QUESTIONS? CALL THE HYATT REGENCY WESTSHORE AT: 813-874-1234

NAME(s) _____

_____

ADDRESS _____

_____ CITY _____

STATE/PROVINCE _____ COUNTRY _____ ZIP _____

OFFICE PHONE NUMBER _____

SHARING ROOM WITH _____ NUMBER OF PERSONS _____

ARRIVAL _____ DEPARTURE _____

SPECIAL REQUESTS _____

Accomodations will be confirmed only with a check for the first night's deposit, or use your credit card to guarantee your reservations. You will be charged for the first night if your reservation is not cancelled prior to 6 p.m.

CREDIT CARD # _____ CREDIT CARD _____

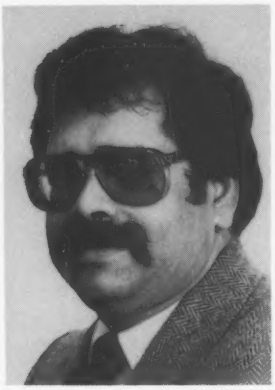
EXPIRATION DATE _____

CARD HOLDERS SIGNATURE _____

SPECIAL ROOM RATES for this convention are $65 plus tax . . . up to 4 persons in a room.

Recreational Vehicle Owners: Clearwater Travel Park
2946 Gulf to Bay Blvd.
Clearwater, FL
813-791-0550
(just across the CCC bridge)

News and Events



Laboratorian of the Year Award Presented to UW-RF Professor

Dr. P.C. Vasavada, Professor of Food Science at the University of Wisconsin-River Falls, recently received the Laboratorian of the Year Award from the Wisconsin Laboratory Association.

WLA, the state-wide professional organization of laboratorians, presented it's Joseph Mityas Memorial Laboratorian of the Year Award at it's annual meeting in Fond du Lac. The award is named for a past president of the WLA and consists of a plaque given in recognition of outstanding contributions to a laboratory-related field.

In presenting the award, WLA president Janet Raddatz said, "Dr. Vasavada has worked tirelessly to promote professionalism in the laboratory as exemplified by his work with various dairy and food industry groups including WLA and WAMFS..." He was cited for his contributions through teaching, extension and research activities.

Vasavada teaches undergraduate courses in Food Science at the University of Wisconsin-River Falls. His extension activity includes planning, conducting and presenting programs on dairy and food microbiology, cheese technology and milk quality to various industry groups, including WLA. He has worked with individual companies on microbiological problems and quality aspects of milk and dairy products. He has organized special symposia on pathogenic bacteria in milk and is frequently invited to make presentations at Dairy Technology Society and other professional groups.

His research activities deals with investigating foodborne pathogens, particularly their occurrence in milk. He has received research grants to investigate the incidence of Campylobacter and Yersinia in raw milk and has presented papers at the meetings of the American Dairy Science Association, National Mastitis Council and International Association of Milk, Food and Environmental Sanitarians. His work has been published in the Journal of Dairy Science and the Science of Food and Agriculture. He also has contributed articles for Hoard's Dairyman and Dairy Herd Management magazines.

Recently, Dr. Vasavada participated in a research project at the University of Minnesota on Listeria monocytogenes. He also is conducting research involving a new laboratory instrument, the catalasemeter, which may be useful in rapid microbiological investigations, including detection of mastitis.

Vasavada joined UW-RF in 1977 as an assistant professor. He received a bachelor's and master's in microbiology from India, a master's in microbiology from the University of Southwest Louisiana, Lafayette, and PhD in Food Science and Dairy Technology from the University of Georgia, Athens.

Biotechnology: Microbial Principles and Processes for Fuels, Chemicals and Biologicals

The Massachusetts Institute of Technology is giving a one week intensive course entitled "Biotechnology: Microbial Principles and Processes for Fuels, Chemicals and Biologicals", August 1-5, 1988.

The purpose of the course is to impart a fundamental understanding of microbial principles and processes for utilizing biological systems for manufacture of fuels, chemicals and biologicals. The emphasis throughout is on basic principles of physiology, biochemistry and genetics of microorganisms that are useful for biochemical processes. Applications of molecular biology procedures for protein engineering and DNA detection procedures are presented. Discussion of current research areas in this field, as well as future needs will be presented. Lectures on important biochemical engineering principles are also covered.

Lectures are by Dr. C.A. Batt, Dr. C.L. Cooney, Dr. A. Kossiakoff, Dr. L.L. McKay, Dr. O.P. Peoples, Dr. C. K. Rha, Dr. A.J. Sinskey, Dr. R.T. Thauer, Dr. G.C. Walker and Dr. C.H. Wong. The program is intended for biologists, chemists, biochemists, engineers, food scientists and managers who are interested in recent development in biotechnology.

If you are interested in obtaining further information, please contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139 or Anthony J. Sinskey, Professor Applied Microbiology, MIT, Cambridge, MA 02139. Telephone: 617-253-6721.

Dr. Joseph A. O'Donnell Named Director of Science and Technology at the Wisconsin Milk Marketing Board

Dr. Joseph A. O'Donnell has recently been appointed director of science and technology at the Wisconsin Milk Marketing Board (WMMB).

This newly created position is part of WMMB's ongoing effort to link the research needs to the dairy industry to the resources of the national scientific community.

O'Donnell brings a broad base of management and scientific expertise to this new position at WMMB. Prior to joining WMMB, he served as vice president of basic product/product research with the United Dairy Industry Association's (UDIA) Dairy Research, Inc. In this position, he was involved with the creation and management of the Dairy Food Research Centers program that includes 10 land-grant universities and two other agricultural universities across the nation.

Prior to joining UDIA, O'Donnell was senior research scientist and group leader in the nutrition research department at Kraft, Inc., and an associate staff nutritionist in the Department of Nutrition Research at Quaker Oats Company.

O'Donnell's professional memberships include: the American Institute of Nutrition; the Chicago Nutrition Association; the Institute of Food Technologists; the American Dairy Science Association; the International Association of Milk, Food and Environmental Sanitarians; and the American Cultured Dairy Products Association.

O'Donnell received his Ph.D. in nutrition from the University of California-Davis, 1978. He received his M.A. in biochemistry from Boston University in 1971; and his Bachelor of Science degree in biochemistry from Illinois Benedictine College, Lisle, Illinois, in 1969.

In-Home Microwave Pasteurization Risky, UW Study Shows

Attempting to pasteurize milk in your kitchen microwave is better than drinking milk straight from the cow, but it's not 100 percent reliable. The microwave method still leaves germs that a reliable pasteurization method would destroy, according to food scientists at the University of Wisconsin-Madison.

The researchers tried to develop a way to pasteurize milk at home. When they simulated pasteurization in home microwaves, they found that harmful bacteria sometimes survived. The resulting milk could have produced a big stomachache - - or worse - - for an unlucky consumer.

The researchers "seeded" sterile milk with three bacterial bad guys - - Salmonella typhimurium and Escherichia coli, strains which can cause gastrointestinal misery; and Pseudomonas fluorescens, which spoils milk. After microwave heating, the researchers refrigerated the milk and cultured samples to determine survival rates.

In the high-temperature, short-time simulation, some bacteria survived even when the milk was heated to 167.4 degrees F - - 6 degrees higher than required - - and held for 15 seconds before cooling.

Microwaves generate heat in food, and the heat kills germs, just like any other cooking method. But microwave ovens don't heat food evenly. Bacteria may have survived in cooler spots in the HTST milk, even though the researchers shook the milk for 15 seconds after heating.

"Because of the difficulties we encountered, the procedure was changed to simulate LTLT pasteurization," March said. "Changes made the procedure more conducive to potential in-home use and increased the time of heat exposure for microorganisms — but it was still not completely effective."

As with the HTST simulation, microwave heating produced sufficiently high final temperatures, yet the test microorganisms survived in greater numbers than when milk was heated conventionally.

"Far too many farm families are drinking raw milk," Marth said. "We hoped we could provide a simple procedure for their kitchens, using equipment they already have, to allow families to pasteurize milk themselves. The treatments we used are better than drinking milk raw, but we didn't achieve 100-percent reliability, so we can't recommend them at this time.

Marth conducted the study with Kathleen Knutson, now of the University of Minnesota, and Mary Wagner, now with General Mills.

For more information, contact: Dr. Elmer Marth, Department of Food Science, University of Wisconsin, Babcock Hall, Madison, WI 53706. Telephone: 608-263-2004.

Galligan Named Food and Dairy EXPO Manager

Patrick M. Galligan has been promoted to the position of show manager for Dairy and Food Industries Supply Association (DFISA). Galligan joined DFISA as director of exhibits in 1986.

In his new position Galligan will be responsible for all facets of DFISA'S trade show, Food and Dairy EXPO. The show is the largest of its kind in the world, encompassing almost seven acres of exhibit space, and attracting more than 26,000 attendees.

Galligan was formerly affiliated with Cherry-Burrell Corporation, the Kitchens of Sara Lee and Honeywell Corp. Galligan received his bachelor of science degree in business administration from Upper Iowa University; and, is a member of the National Association of Exposition Managers.

Food and Dairy EXPO '89, will be held November 11-15, at Chicago's McCormick Place. For more information contact: Dairy and Food Industries Supply Association, Inc. (DFISA), 6245 Executive Blvd., Rockville, MD 20852-3938. Telephone: 301-984-1444.

Updated "Automated Flow Control" Catalog Now Available From Trio-Clover, Inc.

An updated "Automated Flow Control" catalog featuring Tri-Flow valves and flow control and system components, is now available from Tri-Clover, Inc.

The new catalog highlights Tri-Clover's line of replaceable fluorocarbon valve seats that are now standard for Series 361 valves and available as an option for Series 241 and 262-121 Tri-Flo Valves. The new stem/seat design provides secure seating and easy field replacement at low cost by snapping securely into place after the old one has been cut away — no tools, heating, or factory rebuilding is required. Because the stem/seat fits all valve series, existing valves can be easily retrofitted in the field, saving time and repair costs.

The catalog also includes complete application data, size ranges, and specifications on Tri-Flo processing valves, throttling valves, aseptic valves, and tank and kettle valves.

Headquartered in Kenosha, Wisconsin, Tri-Clover, Inc. is a leading manufacturer of sanitary stainless steel valves, pumps and fittings, as well as flow control, batch/weigh and Clean-In-Place (CIP) systems. Founded in 1919, Tri-Clover, Inc. is now a member of the Alfa-Laval Group, a $1.5 billion multi-national organization headquartered in Sweden that operates more than 160 companies in 130 countries around the world.

Send for the 39-page catalog, "Automated Flow Control" from Tri-Clover, Inc., Alfa-Laval Group, 9201 Wilmot Rd, Kenosha, WI 53141-1413.

Bossy the Cow Goes High Tech

Not only does a computer record her milk production and health, it also predicts her romantic moods.

In addition to preventing costly recording errors, a computerized tie-in system like the one added to the Lamaster Dairy Center at Clemson University also can save producers valuable time and labor costs, says Mike Moore, herdsman at the center.

The computer stores milk weights and data on yield, projects each cow's milk production, and keeps track of her illnesses and reproductive cycle.

The system, which was paid for through a research grant, consists of a computer linked directly to the six milk meters in the parlor. The computer can handle weights from up to 16 milk meters at a time and can maintain records on 500 cows.

Because figures from each milking are recorded, herdsmen can immediately detect a decline in production. This can give them a headstart in detecting illness or equipment problems.

Messages or instructions sent from the main computer appear on the screens of the milk meters, thus providing a direct link between the milk parlor and the main office.

A computerized system like the one at Clemson can benefit many dairy operations. However, it offers the greatest advantage to commercial operations that are primarily interested in producing milk, he says.

"Such a system, which costs about $18,000, can see a payback in five years with approximately 150 cows," he says.

Award $225,550 Grants, Scholarships to 178 Students and Teachers

One hundred and seventy-eight management students and teachers who might not otherwise have been able to continue their educations were awarded $225,550 in scholarships, fellowships and grants in programs administered by the Educational Foundation of the National Restaurant Association for the 1987-1988 academic year, it was announced by Richard J. Hauer, Executive Director.

"The foodservice industry's current and projected needs for properly trained and educated managers far exceeds the available supply," said Hauer. "Although the Educational Foundation-administered programs make a major contribution to resolving this shortage, future programs must be substantially increased to keep pace with industry expansion."

Hauer said that the Educational Foundation administers awards which are funded by the International Foodservice Manufacturers Association; the H.J. Heinz Company; Joseph E. Seagram & Sons, Inc.; Griffith Laboratories USA; Artex International, Inc.; Harman Management Corporation, National Restaurant Association, Chicago Foodservice Marketing Club, National Association of Food Equipment Manufacturers, Pizza Inn, Inc., and Anderson Clayton Foods, Inc.

Applications for next year's NRA Teacher Work-Study Grants and Heinz Graduate Fellowships must be postmarked no later than December 31; all other applications must be received by March 1 of each year.

Winners of the annual awards are selected on a national competitive basis by the Scholarship Committee, comprised of leading educators and foodservice industry executives who volunteer their services.

Don't Wash Eggs at Home

Consumers who wash eggs at home before using them are likely to do more harm than good.

Today, eggs in supermarkets have already been cleaned properly and need no further washing, says Dr. Dave Mellor with the Texas Agricultural Extension Service, The Texas A&M University System.

Improper detergents and improper temperatures coupled with inadequate monitoring of detergent or sanitizer levels have caused a lot of problems in the past, says Mellor, a poultry marketing specialist. Most problems occurred when eggs were washed by many people with small flocks and inadequate equipment. As the industry changed, washing was done at fewer and larger locations, and techniques and equipment for washing eggs were improved.

Dirt or stains on egg shells can damage interior contents, notes Mellor. So commercial egg producers use all the proper techniques and equipment to put top quality eggs in grocery cases. For instance, they use water at least 20 degree F. warmer than egg contents to prevent any possible contamination of the egg's interior.

Poor washing practices can easily contaminate eggs. Thus Mellor advises consumers to avoid washing eggs before use and to rely on others to do the job properly before eggs are shipped to the supermarket.

Educational Foundation of the NRA Launches New Series of Courses

Self-development for foodservice managers received a powerful boost with the start of 1988. Through an agreement transferring the Cornell University Foodservice Management Home Study Series to The Educational Foundation of the National Restaurant Association, a wider audience of foodservice manager will now be able to take advantage of these home study courses.

Effective January 1, six hospitality management courses formerly offered by the New York State College of Agriculture and Life Sciences at Cornell University became available through The Educational Foundation to provide managers with skills and knowledge they need to get ahead: enhancing communication, developing employees, honing people skills, upgrading bar management, managing purchases, and improving financial controls.

Henry J. Cockerill, Chairman/President of The Educational Foundation, said, "This series provides a valuable tool for employees to develop themselves and increase their opportunities for advancement within the industry. More importantly, it provides employers with a means of meeting today's employees' needs, thus aiding industry efforts at retaining the most valuable and promotable employees."

George Hayward, Director, Cornell University Home Study Program, said, "The Cornell Home Study Series was created by a distinguished panel of industry leaders and educators to offer the self-development education critical to today's foodservice managers. We feel comfortable that the program we started will be effectively carried forward by the excellent staff of The Educational Foundation."

Courses currently included in the home study series are: *Effective Communication, Managing People, Restaurant Operations and Control, Restaurant Purchasing, Bar and Beverage Management,* and *Helping Employees Grow.*

Two additional courses are nearing completion: *Service Managing the Guest Experience,* and *Restaurant Security.*

For more information, contact The Educational Foundation of the National Restaurant Association, 20 N. Wacker Dr., Suite 2620, Chicago, IL 60606. Telephone: 312-782-1703. The price of each course is $50.00, which includes textbook, study guide, individual grading of assignments by an instructor, a final exam and a Certificate of Completion from the Educational Foundation.

Environmental Sanitation Program (ESP) Update Available From Klenzade

In an effort to provide dairy processors with the most current information available on environmental sanitation, Klenzade, Division of Ecolab Inc., has updated its guide outlining a total environmental sanitation program for dairy processing plants.

Like its earlier edition released in 1986, the "Environmental Sanitation Program" (ESP) updated addresses the wide-ranging program needed in the dairy processing plant to help eliminate sources of possible environmental contamination of products from poor sanitation practices.

The updated booklet examines a number of new programs and products, such as conveyor sanitation, freezer cleaning, mandrel cooling water treatment, fogging ineffectiveness, high pressure cleaning precautions and new micro data. New products include Sani-Glide™ self-foaming acid detergent, Brite-Case™ case wash and Kool-Klene™ freezer cleaner.

For more information about the Klenzade Environmental Sanitation Program (ESP) and the free guide, contact your area Klenzade account manager, Klenzade office of Klenzade, Division of Ecolab Inc., Ecolab Center, 370 Wabaska, St. Paul, MN 55102. Telephone: 612-293-2233.

New Soyfood Product Introductions Skyrocket During 1980s: Tofu, Tempeh, Soymilk, Soy Ice Creams Are Most Popular

The "lighter eating" revolution has catapulted soyfoods into one of America's fastest-growing food categories. A record number 330 new soyfood products were introduced in the United States during 1987, an increase of over 635% since 1977, according to figures released today by The Soyfoods Center.

"The growing number of people who want to stay health and lose weight are realizing that with soyfoods they can cut down on fats, calories, and cholesterol, without losing good taste. Tofu, for example, works beautifully in hundreds of favorite American-style recipes, from burgers and lasagna, to low-calorie dressings and dips. Soyfoods are the protein source of the future—now!" notes William Shurtleff, Soyfoods Center director and author of the best-selling *Book of Tofu* (450,000 copies sold).

Most of the growth in new products since the late 1970s has come from traditional, low-tech products such as tofu, tempeh (which has a texture and flavor like southern-fried chicken), soymilk, miso (a savory high-protein seasoning), soy sauce, and soy nuts, plus modern dairylike soyfoods such as soy ice creams, yogurts, and cheeses. A growing percentage of these foods are favorite American-style convenience products, such as heat-and-serve dinners, or creamy, low-calorie salad dressings and dips.

In the USA, tofu was a major ingredient in 41% of the new products, followed by soymilk (9%), tempeh (9%), soy ice creams (8%), and isolated soy proteins (8%).

Leading product categories were: Basic soyfoods (21%), dairylike products (17%), meatlike products (14%), entrees (11%), beverages (6%), ice creams (5%), and dressings, dips and spreads (4%).

The Soyfoods Center if Lafayette, California, founded in 1976 by William Shurtleff and Akiko Aoyagi Shurtleff, is the world's leading source of information in this rapidly growing new field. Their 15 books - including popular books, technical manuals, market studies, histories, and bibliographies - have sold more than 585,000 copies. The Center produces three computerized databases, has a library of 30,000 documents, and runs an international consulting service.

Here is a sampling of the 330 products introduced during the past year:

·*Lite Lite Tofutti,* a non-dairy frozen dessert with only 90 calories per 4-oz. serving, from Tofutti Brands of Rahway, NJ.

· *PastaLite,* tortellini stuffed with cholesterol-free tofu cheese, from Simply Natural of Norma, NJ.

·*Party Pups,* cocktail-size meatless tofu hot dogs, from Lightlife Foods of Greenfield, MA.

· *Cajun Jerky,* a fiery meatless wonder based on textured soy protein, from Lumen Food Corporation of Lake Charles, LA.

·*Tofu Classics,* pasta and sauce mixes in Creamy Stroganoff, Shells 'n Curry or Mandarin Chow Mein varieties, from Fantastic Foods of Novato, CA.

· *The Barat Bar*, a gourmet non-dairy chocolate bar using tofu instead of milk, from Legume Inc. of Montville, NJ.

· *SoYummy,* a line of soy ice creams in lychee, passion orange, hauupia (coconut), chocolate macadamia nut, and guava flavors, from Soyworld Inc. on Honolulu.

·*French Country Herb Tofu* and *Chinese Five Spice Tofu,* pre-seasoned from Nasoya Foods of Leominster, MA.

·*Tofulite Bar,* a non-dairy frozen dessert on a stick, from Baricini Foods of Mountain Lakes, NJ.

For more information, contact: William Shurtleff, Soyfoods Center, PO Box 234, Lafayette, CA 94549. Telephone: 415-382-2991.

Cheesemaking Steps Offered In New Brochure

The cheesemaking process involves 11 major steps that remain constant for all cheeses. These essential steps are featured in "Steps in Cheesemaking", a new brochure available free from the Wisconsin Milk Marketing Board (WMMB).

Designed to supplement the WMMB's new 17-minute "Art Of Cheesemaking" videotape, the four-page brochure features a step-by-step illustrated description of the cheesemaking process from start to finish. The back page also includes a map of Wisconsin highlighting the location of over 250 of the state's cheesemaking facilities.

"The brochure is a great education tool for use within the industry — for cheese marketer's sales reps, for example, to use with their customers," explained Susan Hughes, WMMB manager - consumer services.

To order a copy, contact WMMB headquarters, 1-800-426-WMMB (in Wisconsin 1-800-221-WMMB) or write to: WMMB, 4337 W. Beltline Hwy, Madison, WI 53711.

New Literature Nitrogen Specific GC Detector

Antek Instruments announces the availability of literature describing the new Model 705 Nitrogen Specific Gas Chromatographic Detector. This two page, four color flyer describes the principle of operation and the major features and benefits of this unique Pyro-chemiluminescent™ detector for GC applications. In addition to complete instrument specifications and a flow diagram, two sample chromatograms show actual environmental testing that has been done with the instrument. Free copies are available from the manufacturer. Contact: Mary Jo Martin, Antek Instruments, Inc., 6005 North Freeway, Houston, TX 77076. Telephone: 713-691-2265.

The National Environmental Health Association

***ANNOUNCES* 1988 ANNUAL EDUCATIONAL CONFERENCE**

June 25-30, Cleveland, Ohio

FEATURING:

Keynote by U.S. Senator Robert Stafford

National Food Certification Test

4 Full Days of Education

NEHA's AEC is the only **major** conference held each year that covers the wide spectrum of issues that comprise environmental health. The Food Protection program is a major portion of the conference agenda. **Some** of the topics that will be covered in the Food Protection program include:

Lobbying the Environmental Health Cause from the Food Protection Perspective; Food Spex-Computers in Food Inspection Program; Oregon Digital Handheld Computers; Imported Ethnic Foods; Cross-Connection Control; Training and Certification of Convenience Store Operators; Quality Assurance and Sanitation; 100 Degrees of Doom-The Time and Temperature Caper

Proposition 65 Update; The CDC Vessel Sanitation Inspection Program; Professional Opinions in the Regulatory Process-Developing the Unicode; Economic Fraud in Seafood; The Role of Biodegradeable Plastics in the Environment-An Alternative; Managing a Comprehensive Environmental Health Program on Board a Cruise Ship.

Advance to the forefront of your profession! Register here...

To register, just send NEHA $155.00 (NEHA member) or $205.00 (NEHA Non-Member). Pre-registration deadline is May 23, 1988. This easy registration includes Continuing Education Units, a continental breakfast, and the banquet finale. Upon receipt, you will be sent a complete list of conference activities for you and your spouse. The hotel rates at the **"4-Star"** Stouffer Tower City Plaza [(216) 696-5600] in downtown Cleveland are $72.00 for single / double / triple.

To register by Purchase Order or by Credit Card, **please call NEHA at (303) 756-9090.** Send in your registration order today to: **NEHA, 720 S. Colorado Blvd., Room 970, Denver, CO 80222**

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New Product News

The products included herein are not necessarily endorsed by Dairy and Food Sanitation.

ICN Biochemicals Announces the Availability of Menhaden Oil and Maxepa Oil Diets

• ICN Biochemicals, a division of ICN Biomedicals, Inc., announces the availability of Menhaden Oil and Maxepa Oil Diets.

Special procedures are required for the proper preparation of Menhaden and Maxepa Oil Diets since these polyunsaturated oils rapidly oxidize upon exposure to air.

Under normal conditions, an unacceptable level of oxidation occurs after just three days of exposure to the atmosphere. In order to minimize oxidation, ICN Biochemicals packages the diets under nitrogen in sealed bags. They recommend that these diets be kept frozen and accordingly, ICN ships them on dry ice.

ICN Biochemicals has also increased the Vitamin E content of High Menhaden and Maxepa Oil Diets in order to avoid a hemolytic syndrome that otherwise would lead to animal mortality.

For further information, please contact: IBN Biochemicals, Division of ICN Biomedicals, Inc., Marketing Communications Dept., 3300 Hyland Ave., Costa Mesa, CA 92626. Telephone: 714-545-0113.

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Ultraviolet Disinfectant Systems for Water Supplies

• A comprehensive line of Ultraviolet Purifiers for destroying all types of micro-organisms in water supplies is available from the American Ultraviolet Company, makers of a broad range of ultraviolet equipment since 1960.

Suitable for both domestic and commercial applications, the Purifiers are produced in sizes to handle from 2 to 180 gallons per minute, and are designed for use in mobile homes, trailers, residential dwellings and offices, pre- and post-treatment reverse osmosis systems, soft drink and water vending machines, laboratories, hotels and motels, and swimming pools and hot tubs.

The systems destroy problem-causing organisms without use of heat or harsh chemicals, and without imparting any foreign taste, odor, corrosive, irritating, or allergenic properties to the water. The systems utilize durable electropolished 304 stainless steel for rust-free operation, feature low power consumption, and are grounded and fused to comply with all electrical codes. Each high intensity lamp is protected in a heavy duty, pure-fused quartz jacket. A L.E.D. pilot light on each ultraviolet lamp circuit assures that the lamp is operational, thereby reducing costly down time.

For more information, write or phone American Ultraviolet Company, 562 Central Avenue, Murray Hill, NJ 07974. Telephone: 201-665-2211.

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Sellers Tank-Man™

• Prosser/Enpo Industries, Inc., announces the new Sellers Tank-Man 3 Nozzle Tank Cleaner - designed for high pressure cleaning and maintenance of beverage/brewery tanks, and chemical/pharmaceutical processing tanks. The 316 stainless steel Tank-Man provides total corrosion free operation. The Tank-Man is hydraulically driven eliminating drive gear and bearing maintenance. Lubrication is provided by the cleaning solution, eliminating lubricant contamination of the process. A slow rotating speed allows 360° , non-striping cleaning pattern with either hot, cold, or caustic cleaning solutions. A special self-clean option allows spray to reach up, under, and around the entire head and pipe joint eliminating residue build-up and inhibiting bacterial growth in CIP installations. Inlet measures 1 1/2" NPT. The unit weighs 13 lbs. and fits thru a 13" opening - ideal for CIP installations. For more information and free literature, contact Prosser/Enpo Industries Inc., 420 E. Third St., Piqua, OH 45356. Telephone: 513-773-2442.

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Packaged Water Treatment Systems Designed to Fit Specific Applications

• Water treatment system from Progressive Equipment Corporation is designed for use in cooling tower systems, chillers, air conditioners, heat exchangers, aftercoolers, furnaces, boilers and more. System reduces or eliminates chemical treatment costs, and increases equipment life and efficiency. Self-monitoring system features solid state power pak, built-in warning system, around-the-clock positive performance indicators, and ASME "UM" certification. For further information, contact: Progressive Equipment Corp., 413 East 9th St., Erie, PA 16503. Telephone: 814-452-4363.

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Permanent "Coating" Treatment Reduces Aluminum Wear up to 90%, Withstands Over 10,000 Hours Salt Spray

• Magnaplate HCR® , a highly corrosion-resistant, "synergistic" coating for aluminum and aluminum alloys, is available from General Magnaplate Corp., Linden, New Jersey.

By introducing oxide bi-metallics in one of the steps of the multi-stage proprietary HCR coating process, hardness rating of up to Rc 70 are achieved. The new surface shows salt spray resistance in excess of 10,000 hours exposure, as well as a dramatic reduction in weight loss during abrasion testing. Taber abrasion measurements show that the wear-resistance of HCR coated aluminum is better than that of case-hardened steel and hard chrome plate. Polymers used to produce this ""synergistic coating" provide a smooth, slippery surface with permanent lubricity.

Technical data and specifications on Magnaplate HCR are available from General Magnaplate Corp., 1331 Route 1, Linden, NJ 07036. Telephone: 201-862-6200

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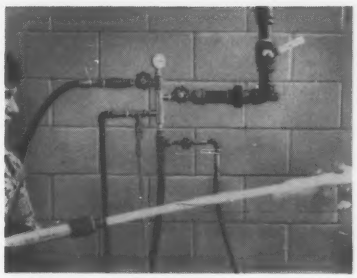

Helios Introduces Hot Foamer

• Helios Research Corporation has developed a TelioJET™ system that provides a constant supply of hot foam for the toughest cleaning applications.

The HelioJET 1000 hot foamer combines all the feature that have made Helios products the industry standard for paper, food, chemical and other processing industries with hard to clean areas which must be sanitized.

A patented HelioPAC™, which has been specially designed for this system, combines in-plant steam with cold water. Detergent is introduced into the HelioPAC and 20-40 psi of shop air is injected, causing the output to foam.

Hot foam that will stick to surfaces to be cleaned is discharged from the 1000 foamer at the rate of two gallons per minute on a continuous basis as needed. The unit operates on 40 psi of water, 40-65 psi steam and 30 psi of air. Discharge temperature ranges from 140 - 165°.

The operator, adjusting the air injection valve, determines foam consistancy. Foam may be sprayed up to 25 feet.

The hot foamer is the latest addition to the growing family of Helios products. The company also manufactures a complete line of pressure amplifier and condenser systems which deliver high pressure hot water at the rate of 15 - 150 gallons per minute at four-to-six times input steam pressure.

For information on the HelioJET 1000 hot foamer, or HelioJET high pressure hot water systems, contact Lee Nicodemus, Marketing Manager, Helios Research Corporation, 38 Dakin Street, Mumford, NY 14511. Telephone: 716-538-6825.

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Steelcote Manufacturing Co.

• Two high performance, low maintenance coatings, U.S.D.A. authorized for use in food processing and packaging plants are featured in this brochure. Literature details the properties and uses of Damp-Tex, a "wet surface" enamel which may be applied to damp or dry surfaces, and Tile-X 2000, an acrylic modified epoxy with outstanding gloss retention and chemical and stain resistance, which explicitly meet the maintenance needs of food and beverage plants. For further information, contact: Steelcote Manufacturing Co., 3418 Gratiot, St. Louis, MO 63103.

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Cantilever Valves Easy-Access/Sanitary

• Requiring no tools, these sanitary valves can be assembled and disassembled with ease. Loosening of the stay in place handgrips, allows the hinged door to open providing easy access to the rotor. This cantilevered design allows complete removal and cleaning of all internal parts. Teflon seal rings remain on rotor hub when rotor is removed. Standard drop-thru or side entry housing are available in both round or square inlet designs. Sanitary 3A dairy approved design is available. Contact: Young Industries, Inc., PO Box 30, Muncy, PA 17756.

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New Stainless Steel Hose Reels

• Reelcraft is introducing a complete new line of Stainless Steel Hose Reels for low and medium pressure applications.

All reels are electro-polished giving them a very attractive finish, allowing them to be used in applications where aesthetics are important, as well as providing for additional protection against corrosion and contamination.

All wetted parts, i.e. main shaft and swivel are likewise machined entirely out of stainless steel allowing for a wide variety of products to be passed through the reels.

The swivel assembly includes Viton "O" ring seals as the standard material.

For additional information, contact: Reelcraft Industries, Inc., PO Box 2448,Columbia City, IN 46725. Telephone: 219-248-8188.

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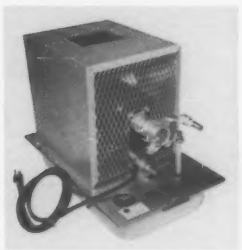

Water Recirculation Unit Decreases Water Usage in Cap Sealing Operations

• Packagers can reduce production costs and water usage in cap sealing operations by utilizing a new inexpensive water recirculation unit from Enercon Industries Corporation (Menomonee Falls, WI). Using a water-to-air heat exchanger, the closed loop recirculation system provides significant water savings.

The compact unit can be installed on existing one or two KW air cooled cap sealing systems to more efficiently cool the system's sealing coils. It operates on standard 115 volt power and can be plumbed to the power supply, using small diameter rubber or plastic hose.

For more information, contact: Bill Zito, Enercon Industries Corp., W140 N9572 Fountain Blvd., PO Box 773, Menomonee Falls, WI 53051. Telephone: 414-255-6070.

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National Testing Labs Offers Comprehensive Water Analysis

• National Testing Laboratories offers a comprehensive, affordable water analysis designed to measure as many as 83 EPA listed contaminants for less than $100.

Watercheck measures everything from metals, PCBs, pesticides, and solvents to bacteria and herbicides. The customer receives a complete report of the findings within five days of receipt of the sample. The Company's laboratories are certified, and use United States Environmental Protection Agency analytical methods and quality assurance procedures.

The Watercheck test kit, a pre-addressed return mailer, includes five sample bottles containing all the needed preservatives, plus detailed step-by-step instructions to insure accurate test results.

For more information, call National Testing Laboratories at 800-458-3330. In Ohio, call 216-449-2525. Or write to National Testing Laboratories, Dept. Z 0121A, 6151 Wilson Mills Rd., Cleveland, OH 44143.

Please circle No. 265 on your Reader Service Card

Enhanced Computerized Inspection System Available

• Oregon Digital System, Inc. has announced a new version of their handheld computerized inspection system, and given it a new name: FieldWritR™. The new version is the result of three years of research and field trials, and responds to customer suggestions for product improvements. Over a dozen custom programming options have been added to the FieldWritR software, along with several accessories to make carrying the 12-ounce computer even more convenient.

The company has also announced the completion of ReportWritR, an integrated companion data management program to the FieldWritR unit. ReportWritR allows FieldWritR users to transfer stored inspection data from the handheld computer into an IBM or compatible PC database, where the data can be reviewed, edited, and analyzed. A number of pre-designed management reports are included which summarize the information that is vital to environmental health administrators.

Oregon Digital has begun an industry newsletter, *The FieldWritR Exchange*, for environmental health professionals interested in applying handheld computer technology in inspection applications. For a free subscription and product brochure, contact: Dick Swenson, R.S. Oregon Digital Systems, PO Box 367, Corvallis, OR 97339-0367. Telephone: 503-752-0448

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Series 3400 Dry Boxes

• Liberty dry boxes are designed to protect, store and move critical materials and prevent contamination. They are dust and moisture-free environments for micro-electronic devices, subminiature parts or biochemical mixtures. Liberty dry boxes feature foam gasketing and positive twist cam locking levers. Boxes are available in clear 1/4" acrylic material or ultra-violet shielding amber. Standard models have one, two, or three compartments.

Double door units can be mounted in a wall or directly on clean bench for pass-through operations.

The dry box can be used in conjunction with a clean bench. The dry box is washed with ultra-clean air in a laminar flow work station. Both sets of doors are opened, allowing the clean air to pass through the box. The box is then loaded and the doors closed while the unit is still on the bench, thus sealing its contents in a dust-free, filtered air environment.

Liberty dry boxes can be custom built for your particular needs in acrylic, stainless steel, PVC or polypropylene. Send us your requirements for a prompt quote.

A pressure relief valve, that adjusts from 0 lbs. to infinity, is offered as an option. Air or gases are exhausted through ports in the side of the valve.

Another option is a quick disconnect, for the introduction of inert gases or other controlled atmospheres into the dry box. It features a tight, leak-proof connection for ease of connecting and disconnecting gas supply.

For more information, contact: John Nappi, Jr., Liberty Industries, Inc., 133 Commerce St., East Berlin, CT 06023. Telephone: 203-828-6361.

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Extraction of Pesticides in Soil, Food and Plant Material

• A great number of pesticides can be extracted by the *Soxtec™HT Systems*, giving equal or better results compared to Soxhlet. Soil, dried plants, grain, flour, animal tissues and various food samples are extracted in 30 minutes.

The control of soils contaminated by electrical fluids at power stations has been simplified. These complicated PCB extractions that used to take 20 hours are safety completed in 3 hours.

Organochlorine pesticides, organophosphorous pesticides, carbamates and triatsine-herbicides are extracted quickly and simply before injection into a gas chromatograph.

These are two Soxtec® System ranges: Soxtec® HT2 with a capacity of one or two samples, and Soxtec® HT6 for determination of up to six samples. Both are equipped with a *solvent recovery feature* reducing the cost for solvent by up to 65%. Extractions are carried out in an extraction unit, heated indirectly by circulating oil from an electronically controlled service unit, *preventing danger of fire*.

For further information, contact: Terri Gleason, Tecator, Inc., PO Box 405, 2875C Towerview Rd., Herndon, VA 22070. Telephone: 703-435-3300.

Please circle No. 268
on your Reader Service Card

Introduction of SIGNAL™ a cowside progesterone test

• SmithKline Animal Health Products, a Division of SmithKline Beckman Corporation, has announced the introduction of SIGNAL™ , a cowside progesterone test.

SIGNAL is a quick, simple cowside milk progesterone test that determines the reproductive status of dairy cows. Accurate and easy-to-use, SIGNAL improves heat detection accuracy and identifies open cows in only ten minutes by a simple color change.

A blue signal test result indicates a low milk progesterone level and that the cow is in or near heat. A white SIGNAL test result indicates high milk progesterone level and that the cow is in mid cycle or pregnant.

A SIGNAL Kit comes complete with 20 tests and requires no equipment. The test procedure has five steps, and results are visually read in only ten minutes - start to finish.

The benefits that can be realized from SIGNAL include:

-Identification of "Open Cows" 19 to 24 days post insemination.
-Confirmation of "Questionable" heat before breeding.
-Improved performance of prostaglandin therapy.
-Increased conception rates.

For more information, contact: Annmarie Gormley, SmithKline Animal Health Products, 1600 Paoli Pike, PO Box 2650, West Chester, PA 19380. Telephone: 800-523-4835, Ext. 281-7506.

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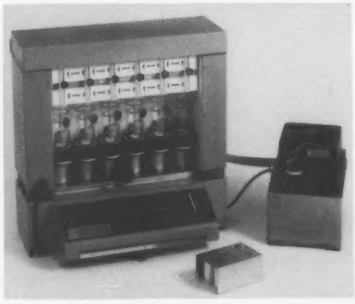

Now Approved for Use in Hazardous Environments Model MSI-4260 "Port-A-Weigh" Digital Crane Scale

• First introduced in 1979, the MSI-4260 "Port-A-Weigh" has gained widespread popularity among industrial users because of its versatility and dependability. MSI is now pleased to announce another major milestone in the Port-A-Weigh's ongoing development. Effective now, Port-A-Weigh has been approved for safe use in hazardous environments by Factory Mutual Research. To date, Port-A-Weigh is the only digital crane scale to possess this property.

The standard Port-A-Weigh equipped with the Factory Mutual option combine to create an intrinsically safe digital crane scale. Hazardous areas where Port-A-Weigh is approved for safe use as defined in Article 500 of the National Electric Code include:

1. Class I, II, and III	2. Class I, II, and III
Division 1	Division 2;
Groups C, D, E, F, and G	Groups A, B, C, D, and G

Other notable features inclusive with the Factory Mutual Approved Port-A-Weigh include: 0.1% applied load accuracy, 1 inch high liquid crystal display, 45 hours continuous use between charging and thrust bearing swivel hook. To obtain complete specifications on this and other MSI products, contact: Measurement Systems International, 12622 Interurban Ave. South, Seattle, WA 98168. Telephone: 206-433-0199.

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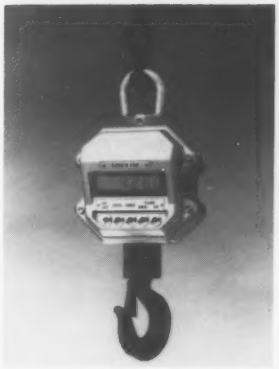

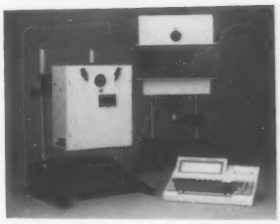

Low-Cost Colorimeter Now Offers More Capabilities Improved User Friendly Operation

• HunterLab has enhanced its low-cost colorimeter to provide customers with greater measurement capability and improved, user-friendly operation.

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HunterLab founded in 1952, designs and manufactures color and appearance instrumentation for numerous manufacturing industries.

For additional information on the new D25-PC2 Colorimeter, please contact HunterLab, 11491 Sunset Hills Rd., Reston, VA 22090. Telephone: 703-471-6870.

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Ethylene Glycol Intoxication Due to Contamination of Water Systems

Within the past 2 years, two instances of ethylene glycol intoxication due to contamination of water systems have been reported to CDC. The first occurred in New York in 1985; the second, in North Dakota in 1987. Details of the two investigations follow.

New York. In March 1985, a 52-year-old hospitalized woman died 1 day after being exposed to ethylene glycol during a session of hemodialysis for chronic renal failure. Review of the events preceding the accident revealed that the hospital's potable water system, which was the source of water used to prepare dialysis fluid, had been inadvertently contaminated when the air-conditioning system was flushed with a commercial solution that is 95% ethylene glycol and contains a marker dye.

Contrary to the municipal building code, there was a direct line connection between the potable water system and the chilled water circuit of the air-conditioning system. This connecting line was open for flushing of the chilled water circuit when the chilled water pump was activated. A check valve in the line failed to prevent backflow from the pressurized circuit into the potable water system. Despite its being detected elsewhere in the hospital, contamination of the potable water went unrecognized in the dialysis unit.

The patient was noted to be somnolent after her final dialysis session, but ethylene glycol intoxication was not suspected until coma, metabolic acidosis, and irreversible shock developed 12 hours later. One other patient had been dialyzed earlier on the same day as the injured patient but showed no evidence of ethylene glycol exposure. One hospital worker had taken a sip of contaminated water but had not swallowed it because of its taste and obvious discoloration. No other exposures were reported

North Dakota. On the evening of April 12, 1987, two children, 4 and 7 years of age, were admitted to a rural North Dakota hospital because of the acute onset of market somnolence, vomiting, and ataxia. After developed hematuria, the children were transferred to the pediatric intensive care unit of a Fargo hospital. They were given fluids intravenously and recovered fully within 2 days. Urinalysis for each child revealed calcium oxalate crystals, and toxicologic studies of their urine samples revealed the presence of ethylene glycol.

On the day they became ill, both children had been at a picnic attended by approximately 400 persons at a firehall in rural North Dakota. Three hundred and fifty-four (91%) of the 391 attendees identified were interviewed by telephone about symptoms related to ethylene glycol toxicity and the foods and beverages they consumed at the picnic. Those persons who reported marked fatigue or ataxia on the evening of the picnic and who had not drunk beer considered as having met the case definition of acute illness. Reports for children under 12 years of age were made by an accompanying adult.

Twenty-nine (8%) of the 354 persons interviewed met the case definition. Nineteen (66%) of the cases were among children younger than 10 years of age. The symptoms most frequently reported were excessive fatigue (90%), excessive sleepiness (76%), unsteadiness when walking (62%), and dizziness (55%). Only the two children mentioned above were hospitalized, and there were no fatalities. One food item, a noncarbonated soft drink, was strongly associated with illness (relative risk, 31.0). Among those who consumed the soft drink, 18% (18/159) became ill, while among nonconsumers, 0.6% (1/176) became ill.

There was a marked dose effect among children under 10 years of age. No cases occurred among those who did not consume the beverage; two cases (10%) occurred among those consuming <1/2 cup; five cases (42%), among those consuming >1/2 to 1 1/2 cups; and 12 cases (80%), among those consuming >1 1/2 cups.

The water used to prepared the powdered beverage had been drawn from he spigot nearest the firehall's heating system. The heating system used a mixture of water and antifreeze and was cross-connected to the potable water supply. The cross-connection was regulated by a single valve. It was uncertain whether the valve had been closed during preparation of the beverage. All other food items and beverages were prepared at a kitchen sink approximately 30 feet from the spigot nearest the heating system. A water sample taken at the spigot the evening of the picnic had an ethylene glycol concentration of 9%.

Because the firehall was not licensed as a public dining facility, it had not been inspected by food service sanitarians. Recommendations were made to redesign the heating system to separate it permanently from the potable water supply.

Editorial Note: Ethylene glycol is a solvent with a sweetish, acrid taste, best known for its use in antifreeze solution. Because of its thermal properties, an ethylene glycol and water solution is sometimes used in the heating and cooling systems of buildings. Acute poisoning from ingestion can result in central nervous system depression, vomiting, hypotension, respiratory failure, coma, convulsions, and renal damage. The fatal dose for ingestion by adults is approximately 100 g.

It is estimated that as many as 60 deaths occur annually in the United Staaes from ethylene glycol poisoning; most of these are due to renal failure. There have been numerous reports of ethylene glycol intoxication among persons drinking it during a suicide attempt, as a substitute for ethanol, or by mistake. These reports cite the ingestion, often by adults or older adolescents, of large amounts of concentrated solutions of antifreeze, resulting in severe illness and a high fatality rate.

The North Dakota outbreak is unusual in three respects: the toxic illness was relatively milk, the patients were mostly younger children, and the source of ethylene glycol was the water supply. Ethylene-glycol-based heating systems, which have become increasingly popular in North

Dakota in the last few years, are usually designed to circulate a heated mixture of ethylene glycol and water through pipes embedded in concrete floors. These systems are most often found in farmers' workshops and auto repair shops. The most effective public health measure for preventing such exposure in ensuring that ethylene-glycol-based heating and cooling systems are not connected to the potable water supply should be disconnected, and other methods should be used to mix water with ethylene glycol in these systems.

The only significant exposure in the New York incident occurred in the dialysis setting. It is unlikely that there was significant ingestion of the contaminated water because of the vivid green color imparted by the marker dye. Moreover, the maximum level of contamination was likely less than 0.5% because this concentration at equilibration with the dialyzed patient's blood would have been immediately fatal (oral ingestion of even 1 liter of 0.5% ethylene glycol would impart a dose of only 5 g). Neither color, odor, nor relatively low concentration of a toxin can protect a patient during dialysis. Only stringent protection of the quality of the water used in dialysis can prevent similar injury to this vulnerable population.

MMWR 9-18-87

Cryptosporidiosis - New Mexico, 1986

Between July 1 and October 1, 1986, 78 laboratory-confirmed cases of cryptosporidiosis were reported to the Office of Epidemiology at the New Mexico Health and Environment Department. Because the source of infection in these cases was unclear, investigators, conducted a case-control study to establish risk factors for infection.

For study purposes, a patient was defined as a Bernalillo County resident with laboratory-confirmed cryptosporidiosis reported to the Office of Epidemiology from July 1 through October 1, 1986. If more than one laboratory-confirmed case occurred in a household or day-care group, only the person with the earliest onset of symptoms was included in the study.

Fifty-eight (74%) of the 78 patients with cryptosporidiosis live in Bernalillo County, which includes the city of Alburquerque. Twenty-four of these patients were included in the study. Thirty-two of the remaining patients were household or day-care contacts of these patients, and two were lost to follow-up.

The 24 patients included in the study were matched with 46 controls by age, sex, and neighborhood of residence. Using a questionniare administered by telephone to both patients and controls, investigators gathered information on household size; day-care-center attendance, employment, or other principal sources of contact; travel; surface-water exposure; pet and domestic animal exposure; and the source of water to the home.

Patients' dates of onset of symptoms ranged from May 28 through September 2, 1986. Symptoms lasted from 5 to 60 days, with a median of 21 days. Ninety-six percent of the patients reported watery, nonbloody diarrhea; 79% reported flatulence; 67%, abdominal pain; 58%, nausea; and 54%, low-grade fever.

Patients ranged in age from 4 months to 44 years, with a median age of 3 years. Seventeen (71%) were <10 years of age. Seventeen (71%) of the patients were female, and seven (29%) were male. Thirteen (77%) of the patients <10 years of age and four (57%) of those >10 were female.

Univariate analysis suggested that drinking untreated surface water and attending a day-care center where other children were ill with diarrhea were possible risk factors for this infection. There was a strong statistical association between drinking surface water and illness (odds ratio [OR] incalculable, $p = 0.0016$). None of these five patients attended a day-care center, the others had no other risk factors for cryptosporidiosis. None of the 46 controls had drunk surface water.

There may have been an increased risk of illness among those who had swum in surface water (OR = 3.7; 95 confidence interval [CI], 0.71 to 12.6). Exposure to surface water (either through drinking or swimming) had occurred in New Mexico, southern Colorado, and Mexico. If the two patients exposed to surface water in Mexico and their controls are eliminated from the analysis, drinking surface water is still significantly associated with illness (OR incalculable, $p = 0.014$). The time between exposure to surface water and illness ranged from 4 to 21 days, with a median of 7 days. The average incubation period of cryptosporidiosis is 2 to 10 days. Fourteen (82%) of the 17 household members with exposures to surface water similar to the patients became ill wit diarrhea within 2 to 7 days.

There was no statistically significant difference between patients and controls in attendance at day-care centers or in employment. However, patients were more likely than controls to attend a day-care center reported by a parent as having other children ill with diarrhea (OR = 5;95% CI, 1.4 to 26.3). A patient was also more likley to be a household contact of a day-care center attendee or employee, but this did not reach statistical significance (OR = 3.7, 95%, CI 0.095 to 14.2).

Editorial Note: Cryptosporidium sp. was recognized as a human pathogen in 1976. The illness is associated with significant morbidity, including diarrhea, which is often prolonged and which can be accompanied by severe weight loss. In immunodeficient persons, cryptosporidiosis can cause life-threatening dehydration. There is no known effective therapy.

Previous outbreaks of cryptosporidiosis have occurred among animal handlers, through direct contact with animal feces, and in day-care centers, through person-to-person contact. An outbreak has also been reported from a Texas community where a common water well became contaminated.

Although surface water has not been previously recognized as a source of infection with Cryptosporidium this study demonstrates that it may be. Further evidence was provided in January 1987 when a major waterborne outbreak of cryptosporidiosis in Georgia was traced to a river serving as the municipal water supply (CDC, unpublished

data). Cryptosporidium sp. has been isolated from a broad variety of animals, including cattle, sheep, dogs, cats, deer, mice, rabbits, and snakes. Cryptosporidium sp. found in cattle have been shown to be transmitted to humans. Surface water might become contaminated through direct deposit of feces into water or by surface runoff that washes feces into water. The seasonal distribution of cryptosporidiosis, which occurs primarily in the summer and early fall, could be partially explained by the increased outdoor activity during that time of year.

Cryptosporidium species are known to be resistant to most chemical disinfectants, such as chlorine and iodine. Physicians should consider cryptosporidiosis in the differential diagnosis of persons with diarrhea who have a history of drinking surface water that is untreated or treated by chemical means alone.

MMWR 8-28-87

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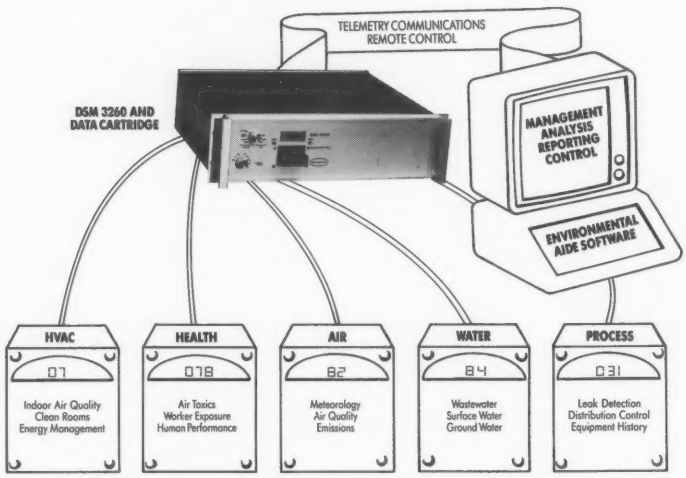

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Teatcup liners are the only component of the entire milking system that physically touches the cow, and yet liners often are the most misunderstood component.

Liners serve two functions: provides a seal around the teat so a partial vacuum can be applied to draw milk from the teat, and provide massage to teat ends to overcome the congestion of blood and extracellular fluids caused by the vacuum.

When applied to the teat, the liners alternate between two phases -- milking and rest. Milk is drawn from the teat by the milking vacuum when the liner is open, during the milk phase. The collapsed liner, during the rest phase, forces the teat canal closed, stopping milk flow and providing massage to the teats.

Teatcup liners can be divided into three types:

1. molded liners with integral short milk tube
2. molded liners with attached short milk tube
3. extruded "ring-type, stretch" liners with attached short milk tube

In addition, manufacturers design liners with various mouthpiece designs, liner wall thickness and hardness, and different shapes and sizes. No single liner will be the best selection for all cows because not all cows' teats are uniform in size and shape. Dairy farmers should choose the best liner type to be used in the herd. Often this can be achieved only by the trial and error method.

Essential characteristics of liners should include the following:

*milk the cow rapidly and completely, leaving minimal strippings

*have sufficient barrel length so the liner will collapse below the teat ends

*remain stable on the teats to minimize liner slippage and fall offs

*minimize teat tissue damage

Milking performance is further enhanced when the liners have a resistance to permanent set and retain a degree of elasticity when they are under tension.

Liners are made of natural and/or synthetic rubber. The normal service life of liners varies with the type of rubber and the abuse they encounter on the dairy. Check with the liner manufacturer to learn their recommendations for liner replacements. It is a "rule of thumb" to replace liners with natural rubber as their main rubber ingredient every 400 to 600 individual cow milkings. Synthetic rubber liners should be changed every 1,000 to 1,200 individual cow milkings. Liners made of silicone rubber should be replaced every 5,000 to 6,000 individual cow milkings.

Liners used past the manufacturers recommended service life may result in undesirable characteristics, for example slower milking and inadequate liner collapse. The best management approach may be to note any change in milking performance when liners are changed. If a difference is seen, change one day earlier each time until no significant difference is evident.

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Affiliate Newsletter

Basic Pasteurization Courses and Special Problems Courses

The Texas Association of Milk, Food and Environmental Sanitarians has finalized plans for five training seminars for 1988. The training seminars are entitled "Basic Pasteurization Course" and "Special Problems in Milk Plants".

The "Special Problems in Milk Plants Course" will be geared towards regulatory personnel, plant managers, plant superintendents, supervisors, and plant engineers.

The "Basic Pasteurization Course" will be geared towards regulatory personnel, plant managers, plant superintendents, supervisors, and plant engineers and operators.

Each course will have a maximum enrollment of fifty registrants. Enrollment for both courses will be administered by Ms. Janie F. Park. It is requested that all applicants contact Ms. Park by telephone at (512) 458-7281, Monday through Friday, between the hours of 7:00 AM through 4:00 PM CST. Filling of seminar dates will be prioritized on a first come, first served basis. The fee enrollment is $150.00 per applicant and may be remitted to Ms. Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363. Checks should be payable to Texas Association of Milk, Food and Environmental Sanitarians or TAMFES. Sustaining members may supply one applicant for these seminars at no charge. Regulatory officials are exempt from the $150.00 enrollment fee.

The training dates for the five seminars and the locations are:

Dallas - March 15-17, BASIC, Holiday Inn, 1575 Regal Row

El Paso - May 10-12, SPECIAL, Howard Johnson, 8887 Gateway West

San Antonio - July 12-14, BASIC, Seven Oaks Hotel, 1400 Austin Hwy

Austin - Sept 13-15, SPECIAL, Howard Johnson Plaza So., IH 35 at Woodward

Houston - Nov 1-3, BASIC, Viscount-Travel Lodge, 1818 Southwest Freeway

Lodging will be the responsibility of the individual registrants.

Please be reminded that the sooner you apply, the more likely you are to be enrolled at your place and on your date of greatest choice. We look forward to seeing you at one of the training seminars.

Affiliate Calendar

1988

April 20, INDIANA ENVIRONMENTAL HEALTH ASSOCIATION, INC. annual spring meeting to be held at the Holiday Inn at the Airport in Indianapolis, IN. For more information, contact: Larry Beddow, Vigo Co. Air Pollution Control, 201 Cherry St., Terre Haute, IN 47807. Telephone: 812-238-8429.

May 16-18, THE PA DAIRY SANTARIANS & LABORATORY DIRECTORS ANNUAL MEETING, to be held at Penn State University. For more information, contact: Sidney Barnard, Food Science Extension Specialist-Dairy, 8 Borland Laboratory, Penn State Univ., University Park, PA 16801. Telephone: 814-863-3915.

May 26, CONNECTICUT ASSOCIATION OF DAIRY AND FOOD SANITARIANS, INC. will hold it's annual meeting. For additional information, contact: Dr. Lester Hankin, The Conn. Agric. Exper. Station, PO Box 1106, New Haven, CT 06504. Telephone: 203-789-7219.

June 6-8, TEXAS ASSOCIATON OF MILK, FOOD & ENVIRONMENTAL SANTARIANS ANNUAL MEETING will be held at the Howard Johnson Plaza-South, Austin, TX. For more information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78613-2363. Telephone: 512-458-7281.

September 26-28, INDIANA ENVIRONMENTAL HEALTH ASSOCIATION, INC., annual fall meeting will be held at the Hilton in Fort Wayne, IN. The contact person is Rosemarie Hansell, Marion Co. Health Dept., 222 East Ohio St., Indianapolis, IN 46204. Telephone: 317-633-9682.

September 27-29, NEW YORK STATE ASSOCIATION OF MILK AND FOOD SANTARIANS annual meeting will be held at Sheraton Inn-Binghamton at Sarbro Square, One Sarbro Square, Binghamton, NY. For more information, contact: Paul Dersam, 27 Sullivan Rd, Alden, NY 14004. Telephone: 716-937-3432.

September 29-30, SOUTH DAKOTA STATE DAIRY ASSOCIATION will hold it annual convention at the Holiday Inn, Brookings, SD. For additional information, contact: Shirley W. Seas, Dairy Science Dept., SD State University, Brookings, SD 57007. Telephone: 605-688-5480.

Book Reviewers Wanted!

Free books to members who read and write book reviews for Dairy and Food Sanitation. For an updated list of books write: Associate Editor, Dairy and Food Sanitation, P.O. Box 701, Ames, IA 50010.

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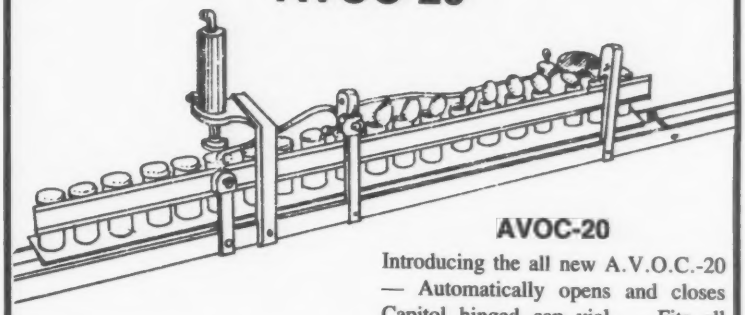

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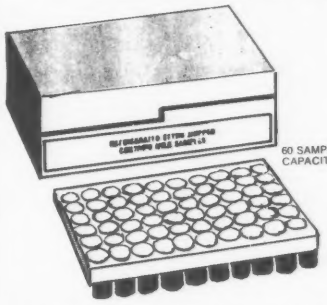

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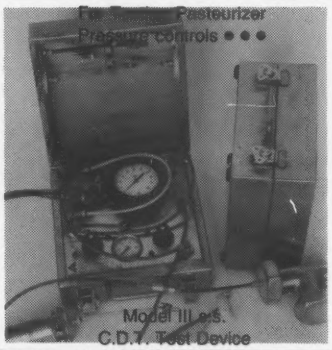

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Retail Case-Life and Microbial Quality of Pre-Marinated, Vacuum Packaged Beef and Chicken Fajitas, D. K. Jones, J. W. Savell, G. R. Acuff and C. Vanderzant, Meats and Muscle Biology Section, Department of Animal Science, Texas Agricultural Experiment Station, Texas A & M University, College Station, Texas 77843

J. Food Prot. 51:260-262

Thirty packages (454 g) each of beef and chicken pre-marinated, vacuum packaged fajitas were obtained from a commercial meat purveyor and placed in a retail case for 16 d. At days 1, 5, 9, 12 and 16, aerobic plate counts (APCs) and microbial types of three randomly selected samples of each product were determined. Samples were also evaluated for surface discoloration, overall appearance, immediate and cooked off-odor and off-flavor. As storage progressed, the pH of products declined, APCs increased and *Lactobacillus* spp. became dominant in the microflora. Some packaged fajitas, especially chicken, exhibited gas formation in random packages throughout the storage periods. Products became "unacceptable" between 12 and 16 d of retail storage.

Role of Hydrogen Peroxide in the Prevention of Growth and Aflatoxin Production by *Aspergillus parasiticus,* Fathy E. El-Gazzar and Elmer H. Marth, Department of Food Science and The Food Research Insitute, Univeristy of Wisconsin-Madison, Madison, Wisconsin 53706

J. Food Prot. 51:263-268

Hydrogen peroxide, 0.0, 0.03, 0.05, 0.3 and 0.5% was added to 25 ml of a glucose-yeast-salts medium which was inoculated with 1 ml of a spore suspension containing 10^6 conidia of *Aspergillus parasiticus* NRRL 2999 and then was incubated at 14 or 28°C. Cultures held at 28°C were analyzed after 3, 7 and 10 d for mycelial dry weight, pH and accumulation of aflatoxin B_1 and G_1. Incubation of some cultures at 28°C was continued for 90 d. Cultures held at 14°C were analyzed after 1, 2 and 3 months for mycelial dry weight, pH and aflatoxin production. Amounts of aflatoxin produced were determined using reversed-phase high-performance liquid chromatography (HPLC). The percentage of inhibition or stimulation by the additive was used to make comparisons between treatments and control. Overall, increasing the concentration of hydrogen peroxide to 0.3 or 0.5% completely prevented growth and aflatoxin production for up to 90 d of incubation at 14 or 28°C.

Preliminary Studies of Microfiltration for Food Processing Water Reuse, Marcus R. Hart, Charles C. Huxcoll, Lee-Shin Tsai and Keng C. Ng, Western Regional Center, Agricultural Research Service, U>S> Department of Agriculture, 800 Buchanan Street, Albany, California 94710

J. Food Prot. 51:269-276

Microfiltration of poultry scalder and chiller water and frankfurter chiller brine was examined in limited tests and found to produce permeates that may be recycled to the original systems. All permeates achieved turbidity readings of less than 50 NTU, with many less than 1 NTU, and all had plate counts of less than 10 microorganisms per ml. Except for brine, waters were filtered at the highest known plant operating temperatures. After 90 min of operation, flux rates as high as 110-440 L/m^2h were achieved, depending on the water and filter conditions used. Flux rates were restored by as little as 15 min of in-line cleaning at 78-80°C with a detergent solution. Major advantages for the process are: *(a)* substantial energy savings through reuse of previously heated or cooled waters, *(b)* reduced disposal costs, especially through brine reuse, and *(c)* possible byproduct recovery of protein and fat concentrated in poultry retentate waters.

Growth of *Listeria monocytogenes* at 10°C in Milk Preincubated with Selected Pseudomonads, Douglas L. Marshall and Ronald H. Schmidt, Food Science and Human Nutrition Department, University of Florida, Gainesville, Florida 32611

J. Food Prot. 51:277-282

Preliminary studies involving co-inoculation of *Listeria monocytogenes* with *Pseudomonas fragi* into whole or skim milk demonstrated that neither inhibition nor stimulation of growth occurred for either organism. Additional investigations involved preincubation of whole milk, skim milk, and 10% reconstituted nonfat dry milk (NDM) for 3 d at 10°C with *P. fragi*, *Pseudomonas fluorescens* P26, *P. fluorescens* T25, or *P. fluorescens* B52, followed by inoculation with *L. monocytogenes* and further incubation at 10°C. Growth curves of *L. monocytogenes* were constructed for each treatment combination and generation times were statistically compared for differences. Results indicated that *L. monocytogenes* did not affect growth or survival of the preincubated *Pseudomonas* spp. However, growth rates of *L. monocytogenes* were significantly ($P<0.05$) enhanced in milks

preincubated with pseudomonads. Doubling times of *L. monocytogenes* were reduced by up to 3 h when grown in milk preincubated with *Pseudomonas* spp. Three strains of *P. fluorescens* showed more stimulation of the growth rate of *L. monocytogenes* compared to *P. fragi* in preincubated whole or skim milk but not in preincubated NDM. Milk composition had little effect on growth of either genus when incubated alone. Results of this study indicate that *L. monocytogenes* can grow in the presence of *Pseudomonas* spp. either as a co-inoculant or following preincubation in milk at 10°C. Furthermore, data suggest that the presence of the pseudomonads may enhance growth of *L. monocytogenes* in milk.

Gas-Liquid Chromatographic Determination of Propionic Acid Production Differentiates between the Food-Poisoning Strains and Toxigenic-Type Strains of *Clostridium perfringens*, Fusao Kondo and Sheiji Nagasue, Department of Veterinary Public Health, Facility of Agriculture, Miyazaki University, 7710 Kumano, Miyazaki-shi, Japan 889-21

J. Food Prot. 51:283-288

Fatty acids of 32 strains belonging to five types of *Clostridium perfringens* were extracted from the supernatant liquid of cultures in various different media prepared with or without the addition of sugar and examined by application of the gas-liquid chromatographic technique. The major products in nearly all media were acetic, propionic and butyric acid among the volatile fatty acids and only lactic acid among the non-volatile fatty acids. Quantitative comparison of the resulting chromatograms with regard to the presence and relative amounts of propionic acid as one of the large major peaks revealed clear differences between the toxigenic types and the food-poisoning strains of this organism. In cooked meat medium containing 2% fructose, all the toxigenic-type strains produced propionic acid, but the food-poisoning strains tested entirely lacked production of this acid. This differentiation characteristic may be useful in routine laboratory bacteriology.

Hazelnuts as Possible Substrate for Aflatoxin Production, V. Sanchis, M. L. Quilez, R. Viladrich, I. Viñas and R. Canela, Laboratorio de Microbiología, Dep. Technología de Alimentos, Universitat Politècnica de Catalunya, Rovira Roure 177, 25006-Lleida, Spain, and Laboratorio de Química, Dep. Producción Vegetal, Universitat Politecnica de Catalunya, Rovira Roure 177, 25006-Lleida, Spain

J. Food Prot. 51:289-292

A study was carried out on the fungal contamination of commercially available hazelnuts, and the effect of different factors (water activity, temperature and presence of potassium sorbate) on fungal growth and aflatoxin production in hazelnuts. All samples (100%) of raw hazelnuts showed fungal contamination. None of the samples showed aflatoxin contamination, but when hazelnuts were inoculated with *Aspergillus parasiticus*, and water activity and temperature were optimal for mold growth, high production of aflatoxin was found. Potassium sorbate at subinhibitory levels seemed to inhibit fungal growth, but enhanced aflatoxin production.

Hazard Analyses of Foods Prepared by Inhabitants Along the Peruvian Amazon River, Silvia Michanie, Frank L. Bryan, Nelly Mendoza Fernández, Magda Moscoso Vizcarra, Dora Taboada, P., Obdulia Navarros, Aurora Bravo Alonso, and Lita Santillan M., Veterinary Public Health Program, Pan American Zoonoses Center (CEPANZO), Pan American Health Organization, Casilla Correo 3092 (1000) Buenos Aires, Argentina

J. Food Prot. 51:293-302

Hazard analyses of food preparation practices were conducted in two households in Indiana (a settlement along the Peruvian Amazon River), in a household in a cluster of about a half dozen houses up river, and in three households in Belen (a district near Iquitos), Peru. These analyses consisted of watching all steps of the operation, recording temperatures throughout all these steps, and collecting samples of food and testing them for common foodborne pathogens and indicator organisms. Foods prepared included rice, plantains, yuca, dry fish, fresh fish, beef, and chicken. During cooking, foods attained temperatures of at least 93.3°C; they usually boiled. Such time-temperature exposure would kill vegetative forms of foodborne pathogenic bacteria, but not heat-resistant spores. When cooked foods were leftover, they were kept either on tables or on the unheated stoves or grills on which they were cooked. During this interval, at the prevailing ambient temperature and high humidity of the jungle region, conditions were such that considerable microbial growth could occur. Time of exposure, however, limited counts to the 10^5-10^6 level. In the evening, foods were only mildly reheated, if reheated at all, so temperatures were not attained in the center regions of the food that would have killed microorganisms that had multiplied during the holding period. Hence, the primary critical control point is holding between cooking and serving, but cooking and reheating are critical control points also.

Influence of Spoilage Flora and Temperature on Growth of *Staphylococcus aureus* in Turkey Meat, Xiaonian Yang, R. G. Board and G. C. Mead, School of Biological Sciences, Bath University, Bath BA2 7AY and Agricultural and Food Research Council, Institute of Food Research - Bristol Laboratory, Langford, Bristol BS18 7DY, Avon, UK

J. Food Prot. 51:303-309

Staphylococcus aureus isolated from a turkey processing plant grew in ground turkey muscle, either leg or breast, contaminated with spoilage bacteria with incubation at 15, 20 or 23°C. No growth occurred with incubation at 7 or 10°C. The rate and extent of growth of *S. aureus* at 15 and 20°C were increased by cooking the muscle before inoculation. Toxin production during growth of *S. aureus* on turkey muscle was demonstrated on one occasion only.

Heat Stability of the Bile Salt-Stimulated Lipase in Human Milk Fortified with Sodium Taurocholate, H. L. Pan, C. W. Dill, E. S. Alford, S. L. Dill, C. A. Bailey, R. L. Richter and C. Garza

J. Food Prot. 51:310-313

Time-temperature relationships for heat-inactivation of the bile salt-stimulated lipase activity were compared in whole human milk and in the same product fortified to 9 m*M*/ml with sodium taurocholate. Heat treatments were varied from 45 to 70°C for times ranging from 15 s to 40 min. Enzyme activity was more heat stable in human milk fortified with taurocholate than in control samples. The temperature required for the onset of heat inactivation at 30-min holding time was increased from 45°C for control samples to 60°C following addition of taurocholate. A temperature differential of approximately 12°C was required in the fortified milks to produce inactivation equivalent to that observed in the control milks over the heating range studied.

Hazard Analyses of Food Prepared by Migrants Living in a New Settlement at the Outskirts of Lima, Peru, Frank L. Bryan, Silvia Michanie, Nelly Mendoza Fernández, Magda Moscoso Vizcarra, Dora Taboada P., Obdulia Navarros, Aurora Bravo Alonso, and Elena Buerra Requejo, Veterinary Public Health Program, Pan American Zoonoses Center (CEPANZO), Pan American Health Organization, Casilla 3092, 1000 Correo Central, Buenos Aires, Argentina

J. Food Prot. 51:314-323

Hazard analyses of food preparation practices were conducted in three households in a new settlement in the rocky, dusty hillsides at the outskirts of Lima, Peru. These analyses consisted of watching all steps of preparation, recording temperatures throughout these steps, and collecting samples of the food and testing them for common foodborne pathogens and indicator organisms. The residents had migrated from different regions of the country; consequently, they prepared different foods. These included soya cereal, milk formula, rice and carrots for feeding a baby who had diarrhea, soups, mashed potatoes with spinach, carrot and beet salad, cow's foot soup, beans, rice and a mixture of beans and rice. The temperatures attained were high enough to kill vegetative forms of foodborne pathogens, but not their spores. During the interval between cooking in the morning and serving at either lunch or supper time, foods were held either on unheated ranges or in unheated ovens. This interval was long enough to permit some bacterial multiplication, but apparently not to massive quantities. Just before the evening meal, foods were reheated to temperatures that usually exceeded 70°C. Rice, however, was either served cold or if reheated, the center temperature rose a few degrees only. Critical control points for preparation of family meals are cooking, holding between cooking and serving, and reheating. Critical control points for milk formula for babies are using recently-boiled water for the formula, cleaning and boiling bottles and nipples, and, of particular importance, time of holding at room temperature.

Occurrence of *Bacillus cereus* in Meat Products, Raw Meat and Meat Product Additives, Hirota Konuma, Kunihiro Shinagawa, Masakazu Tokumaru, Youichi Onoue, Sumio Konno, Norio Fujino, Tamotsu Shigehisa, Hiroshi Kurata, Yoshihiro Kuwabara and Carlos A. M. Lopes, Department of Microbiology, National Institute of Hygienic Sciences, 18-1 Kamiyoga 1-chome, Setagaya-Ku, Tokyo 158, Japan

J. Food Prot. 51:324-326

One thousand nine hundred and sixty three samples of meat products, raw meat and meat product additives from different slaughterhouses, meat processing factories and retail meat shops in six prefectures of Japan, were examined for the presence and number of *Bacillus cereus*. Although *B. cereus* was found in meat products (18.3%) and raw meat (6.6%), the contamination levels were generally lower than 10^2 per gram. In contrast, meat product additives showed contamination levels ranging from 10^2 to 10^4/g with the highest values (10^4/g) in samples of spices and animal proteins. On the basis of these results, we suggest that the main source of *B. cereus* contamination in meat products is contaminated meat product additives.

Incidence of Foodborne Diseases in The Netherlands: Annual Summary 1982 and an Overview from 1979 to 1982, H. J. Beckers, Laboratory for Water and Food Microbiology, National Institute of Public Health and Environmental Hygiene, P.O. Box 1, 3720 BA Bilthoven, The Netherlands

J. Food Prot. 51:327-334

Data on the incidence of foodborne disease in 1982 are presented. A total of 319 incidents affecting 1376 ill persons was analyzed. In 86 incidents (553 cases), the etiology was established. Microorganisms appeared to be the main causative agents: *Bacillus cereus* was responsible for 17 of these incidents (53 cases), *Salmonella* for 15 (83 cases), *Campylobacter jejuni* and *Staphylococcus aureus* for 11 (220 and 51 cases, respectively). *Clostridium perfringens* for 10 (96) and *Yersinia enterocolitica* for 1 (3). In 2 outbreaks (7 cases), several bacterial agents were detected without being able to discover which one had caused the symptoms. In 7 episodes (13 cases), illness resulted from ingestion of food contaminated with scombrotoxin. In one incident (4 cases), food had been contaminated with an excess of nutmeg and in 9 (20 cases) with monosodium glutamate. Two episodes (3 cases) were attributed to spoiled food. Cases of foodborne disease recorded by the Chief Medical Inspectorate, but not analyzed due to a lack of epidemiological information, included infections from *Salmonella* (6795), *C. jejuni* (1728) and *Y. enterocolitica* (274). Meat and meat products (24 incidents), fish and shellfish (25), snacks (21) and Dutch meals (23), but especially Chinese foods (132) were associated with incidents most frequently. About 70% of the incidents involved places where food is prepared for immediate consumption. Examples of outbreaks are presented.

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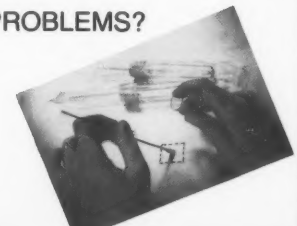

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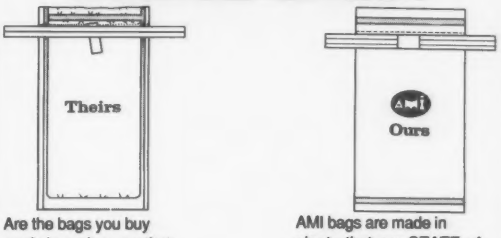

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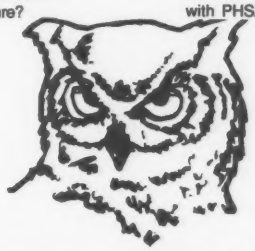

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Calendar

1988

April 18-20, BASIC ELECTRICAL MAINTENANCE FOR WATER & WASTEWATER PERSONNEL will be held in West Palm Beach, FL. For more information, contact: Dr. Barbara Mitchell. Telephone: 904-392-9570.

April 18-21, AMERICAN DAIRY PRODUCTS INSTITUTE ANNUAL MEETING & TECHNICAL CONFERENCE, to be held at Chicago O'Hare Marriott Hotel, Chicago, IL. For more information, contact: Warren S. Clark, Jr. 130 N. Franklin Street, Chicago, IL 60606.

April 20, INDIANA ENVIRONMENTAL HEALTH ASSOCIATION, INC. Annual Spring Meeting to be held at the Holiday Inn at the Airport in Indianapolis, IN. The person to contact for information is: Larry Beddow, Vigo Co. Air Pollution Control, 201 Cherry Street, Terre Haute, IN 47807. Telephone: 812-238-8429.

April 20-21, 1988 CENTER FOR DAIRY RESEARCH CONFERENCE (MILKFAT: TRENDS AND UTILIZATION), alternates with Cheese Research and Technology Conference, to be held at the Holiday Inn Southeast, Madison, WI. For more information, contact: Lee Jensen, Center for Dairy Research, University of Wisconsin-Madison, 1605 Linden Drive, Madison, WI 53706. 608-262-2264.

April 25-27, FLEXIBLE PACKAGING TECHNOLOGY, will be held in Chicago. For more information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

April 27-29, PIZZA PRODUCTION SEMINAR, is being sponsored by the American Institute of Baking and support of the National Frozen Pizza Institute and the National Association of Pizza Operators. It will be held a the Holiday Inn/Holidome, Manhattan, Kansas. For additional information, contact: Dr. Brensing, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. Telephone: 913-537-4750.

April 28-29, SCALE-UP IN THE FOOD PROCESSING INDUSTRY, will be held in New Jersey. For more information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

May 5-6, MOISTURE MANAGEMENT IN FOOD SYSTEMS, sponsored by the Center for Professional Advancement will be held in New Jersey. For more information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

May 10-12, GOOD MANUFACTURING PRACTICES (GMP) FOR THE FOOD INDUSTRY will be held in Chicago. For more information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, New Jersey 08816. Telephone: 201-613-4500.

May 10-12, SPECIAL PROBLEMS IN MILK PLANTS COURSE, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians to be held at the Howard Johnson, 8887 Gateway West, El Paso. For more information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363. Telephone: 512-458-7281.

May 9-12, PURDUE ASEPTIC PROCESSING AND PACKAGING WORKSHOP, sponsored by the Food Science Department at Purdue University. For more information, contact: James V. Chambers, Food Science Dept., Smith Hall, Purdue University, West Lafayette, IN 47907. Telephone: 317-494-8279.

May 10-11, THE NEW ADVANCED NATIONAL FOOD PROCESSING AND WAREHOUSING SANITATION COURSE, will be presented by the American Sanitation Institute in St. Louis. For more information, contact: Christine Verplank, the American Sanitation Institute, PO Box 24198, St Louis, MO 63130. Telephone: 800-325-3371.

May 10-13, HAZARDOUS WASTE MANAGEMENT, will be held in New Jersey. The short course is sponsored by the Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

May 10-13, INCINERATION OF HAZARDOUS AND NON-HAZARDOUS WASTE, will be held in Chicago. For more information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

May 16, EPA ORGANIC LABORATORY DATA QA/QC VALIDATION will be held in Pittsburgh. This is is conjunction with Analytical & Environmental Training Courses. For more information, contact: Barbara, Professional Analytical & Consulting Services, Inc., 409 Meade Dr., Coraopolis, PA 15108. Telephone: 412-262-4222.

May 16-18, THE PA DAIRY SANITARIANS & LABORATORY DIRECTORS ANNUAL MEETING, to be held at Penn State University. For more information, contact: Sidney Barnard, Food Science Extension Specialist-Dairy, 8 Borland Laboratory, Penn State Univ., University Park, PA 16802. Telephone: 814-863-3915.

May 16-18, INDUSTRIAL BIOLOGICAL WASTEWATER TREATMENT, will be held in Atlanta. For additional information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

May 16-19, CONFECTIONAY AND CHOCOLATE PRODUCTION, will be held in New Jersey. For more information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

May 17-18, BASICS OF LABORATORY QA/QC (70), will be held in Pittsburgh. Course provided by Professional Analytical & Consulting Services, Inc. For more information, contact: Barbara, Professional Analytical & Consulting Services, Inc., 409 Meade Dr., Coraopolis, PA 15108. Telephone: 412-262-4222.

May 19, EPA INORGANIC LABORATORY DATA QA/QC VALIDATION (80), will be held in Pittsburgh, PA. For more information, contact: Barbara, Professional Analytical & Consulting Services, Inc. Telephone: 412-262-4222.

May 19-20, ANALYTICAL & ENVIRONMENTAL TRAINING COURSES will be held in Pittsburgh, PA. The course title is Mass Spectrometry for Managers (05). For more information, contact: Barbara at Professional Analytical and Consulting Services, Inc., 409 Meade Drive, Coraopolis, PA 15108. Telephone: 412-262-4222.

May 19-20, SCALE-UP IN THE FOOD PROCESSING INDUSTRY, will be held in Chicago. For additional information, contact: The Center for Professional Advancement, PO Box H, New Brunswick, NY 08816. Telephone: 201-613-4500.

May 22-24, GEORGIA DAIRY PRODUCTS ASSOCIATION ANNUAL CONVENTION, to be held at Callaway Gardens, Pine Mountain, GA. For more information, contact: Pat Hamlin, P.O. Box 801, Macon, GA 31208.

May 26, CONNECTICUT ASSOCIATION OF DAIRY AND FOOD SANITARIANS annual meeting. For more information, contact: Lester Hankin, The Conn. Agric. Exper. Sta., PO Box 1106, New Haven, CT 06504. Telephone: 203-789-7129.

May 29-June 2. INTERNATIONAL CONFERENCE ON MASTITIS will be held in St. Georgen/Langsee, Carinthia, Austria. For information, contact: Prof. Dr. E. Glawischnig, International Conference on Mastitis, II. Medizinische Universitatsklinik for Klauentiere, der Veterinarmedizinischen Universitat in Wien, Linke Bahngasse 11, A-1030 Vienne, Austria. Telephone: 0222 / 73 55 81 ext. 500, 501.

June 1, BASICS OF TOXICOLOGY, will be held in Pittsburgh, PA. Offered by the Professional Analytical & Consulting Services, Inc. For more information, contact: Barbara, Professional Analytical & Consulting Services, Inc., 409 Meade Dr., Coraopolis, PA 15108. Telephone: 412-262-4222.

June 1-3, RESPIRATORY PROTECTION, will be held in New Jersey. The short course is sponsored by the The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

June 2-3, BASICS OF INFRARED SPECTROMETRY & SPECTRAL INTERPRETATION will be conducted by the Professioal Analytical & Consulting Services in Pittsburgh. For more information, contact: Barbara, Professional Analytical and Consulting Services, Inc., 409 Meade Dr., Coraopolis, PA 15108. Telephone: 412-262-4222.

June 6-8, TEXAS ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS ANNUAL MEETING to be held at the Howard Johnson Plaza-South, Austin, TX. For more information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78613-2363. Telephone: 512-458-7281.

June 6-9 EPA ENVIRONMENTAL ANALYTICAL CHEMISTRY (130), will be

offered by the Professional Analytical & Consulting Services, Inc., in Pittsburgh, PA. For more information, contact: Barbara, Professional Analytical & Consulting Services, Inc., 409 Meade Dr., Coraopolis, PA 15108. Telephone: 412-262-4222.

June 6-9, EVALUATION AND CONTROL OF PROCESS HAZARDS, will be held in New Jersey. For additional information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

June 7-9, ACQUATIC TOXICITY REDUCTION IN INDUSTRIAL, sponsored by the The Center for Professional Advancement will be held in New Jersey. For additional information, contact: The Center for Professional Advancement, PO Box H, East Brunswick, NJ 08816. Telephone: 201-613-4500.

July 8-15 RAPID METHODS AND AUTOMATION IN MICROBIOLOGY will be held at Kansas State University. The workshop is certified by American Society for Microbiology for Continuing Education Credits. Contact Dr. Daniel Y.C. Fung, Call Hall, Kansas State University, Manhattan, KS 66506. Telephone: 913-532-5654.

July 11-13, AMERICAN INSTITUTE OF BAKING IN MANHATTAN has scheduled an updated seminar entitled ""Dietary Fiber" in Manhattan, Kansas. For more information write to the Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502. Telephone: 800-633-5137

July 12-14, BASIC PASTEURIZATION COURSE, sponsored by the Texas Association of Milk, Food and Environmental Sanitarians will be held at the Seven Oaks Hotel, 1400 Austin Hwy, San Antonio. For additional information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363. Telephone: 512-458-7281.

July 31-August 4, IAMFES 75th ANNUAL MEETING, to be held at the Hyatt Regency Westshore, Tampa, FL. For more information, contact Kathy R. Hathaway, IAMFES, Inc., PO Box 701, Ames, IA 50010. 800-525-5223, in Iowa 515-232-6699.

August 1-5, BIOTECHNOLOGY: MICROBIAL PRINCIPLES AND PROCESSES FOR FUELS, CHEMICALS AND BIOLOGICALS, sponsored by the Massachusetts Institute of Technology, Cambridge, MA. For further information, contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139.

August 7-12, 1988 ANNUAL MEETING OF THE SOCIETY FOR INDUSTRIAL MICROBIOLOGY, to be held at the Hyatt Regency, Chicago, IL. For more information, contact: Mrs. Ann Kulback, SIM, PO Box 12534, Arlington, VA 22209-8534.

September 7-8, ANNUAL CONFERENCE OF THE NORTH CENTRAL CHEESE INDUSTRIES ASSOCIATION, South Dakota State University, Brookings, SD. For further information, contact: E. A. Zottola, Sec-Treas., NCCIA, PO Box 8113, St. Paul, MN 55108.

September 11-13, NATIONAL DAIRY COUNCIL OF CANADA ANNUAL CONVENTION, to be held at the Winnipeg Convention Centre, Winnipeg, Manitoba. For more information, contact: Pat MacKenzie, 141 Laurier Avenue West, Ottawa, Ontario, Canada K1P-5J3.

September 11-14, SOUTHERN ASSOCIATION OF DAIRY FOOD MANUFACTURERS, INC. 74TH ANNUAL CONVENTION, to be held at the Boca Raton Hotel & Club, Boca Raton, FL. For more information, contact: John E. Johnson, P.O. Box 1050, Raleigh, NC 27605.

September 13-15, SPECIAL PROBLEMS IN MILK PLANTS COURSE, sponsored by the Texas Asssociation of Milk, Food and Environmental Santarians. To be held at the Howard Johnson Plaza So., IH 35 at Woodward, Austin. For more information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363. Telephone: 512-458-7281.

September 21-22, UNITED DAIRY INDUSTRY ASSOCIATION ANNUAL MEETING, to be held at the Hyatt Regency Minneapolis, Minneapolis, MN. For more information, contact: Edward A. Peterson, 6300 N. River Road, Rosemont, IL 60018.

September 26-28, INDIANA ENVIORNMENTAL HEALTH ASSOCIATON, INC. Annual Fall Meeting to be held at the Hilton Inn in Fort Wayne, IN. For information, contact: Rosemarie Hansell, Marion Co. Health Dept., 222 East Ohio St., Indianapolis, IN 46204. Telephone: 317-633-9682.

September 27-29, NEW YORK STATE ASSOCIATION OF MILK AND FOOD SANITARIANS, to hold annual meeting at the Sheraton Inn-Binghamton, Sarbro Square, One Sarbro Square, Binghamton, NY 13901. For more information, contact: Paul Dersam, 27 Sullivan Rd, Alden, NY 14004. Telephone: 716-937-3432.

September 29-30, SOUTH DAKOTA STATE DAIRY ASSOCIATION, will hold it's annual convention at the Holiday Inn, Brookings, SD. For more information, contact: Shirley W. Seas, Dairy Science Dept., SD State Univ., Brookings, SD 57007. Telephone: 605-688-5480.

October 9-13, AACC ANNUAL MEETING, to be held at the Hotel InterContinental San Diego, in San Diego, California. For more information, contact: Raymond J. Tarleton, American Assoc. of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, MN 55121. 612-454-7250.

October 15-19, MILK INDUSTRY FOUNDATION & INTERNATIONAL ICE CREAM ASSOCIATION ANNUAL CONVENTION & SHOW, to be held at Marriott's Orlando World Center, Orlando, FL. For more information, contact: John F. Speer, Jr., 888 16th Street, NW, Washington, DC 20006.

October 31-November 2, FOOD PROCESSING WASTE CONFERENCE, will be held at the Pierremont Plaza Hotel, Atlanta, Georgia. The conference is sponsored by the Environment, Health and Safety Division, Georgia Tech Research Institute. Additional information can be obtained from Edd Valentine or Chuck Ross, Georgia Tech Research Institute, Economic Development Laboratory, Environmental, Health, and Safety Division, Atlanta, GA 30332. Telephone: 404-894-3412.

November 1-3, BASIC PASTEURIZATION COURSE, to be held at the Viscount-Travel Lodge, 1818 Southwest Freeway, Houston will be sponsored by the Texas Association of Milk, Food and Environmental Santarians. For more information, contact: Janie Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363. Telephone: 512-458-7281.

November 28-December 1, NATIONAL MILK PRODUCERS FEDERATION ANNUAL MEETING, to be held at the Hilton, Anaheim, CA. For more information, contact: James C. Barr, 1840 Wilson Blvd., Arlington, VA 22201.

November 30-December 1, FIELD AND LABORATORY SAMPLING OF FOOD, DRUGS, AND AGRICULTURAL COMMODITIES, to be held in Arlington, VA. Course size is limited and on a "first come" basis. To register, first verify space availibility by calling or writing AOAC Education Dept., 1111 N. 19th St., Suite 210, Arlington, VA 22209. Telephone 703-522-3032.

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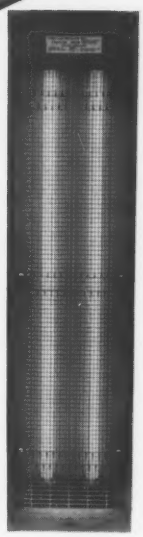

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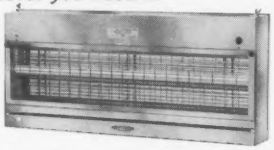

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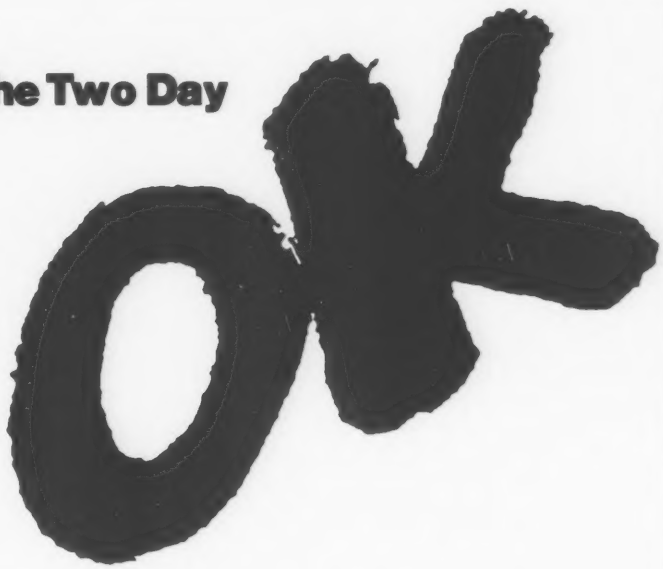

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102	115	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323	336	349
103	116	129	142	155	168	181	194	207	220	233	246	259	272	285	298	311	324	337	350
104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
106	119	132	145	158	171	184	197	210	223	236	249	262	275	288	301	314	327	340	353
107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
113	126	139	152	165	178	191	204	217	230	243	256	269	282	295	308	321	334	347	360

Place
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Ames, Iowa 50010

Enjoy . . . the 75th IAMFES

Annual Meeting July 31- August 4, 1988

HYATT REGENCY® WESTSHORE

AT TAMPA INTERNATIONAL

Meeting & Hotel Registration Forms on page 197 & 199

Fact Sheet

Location :

- On the shores of Old Tampa Bay
- Four minutes, door to door, from Tampa International Airport
- Adjacent to the Westshore Business District
- 6 miles to downtown Tampa
- In close proximity to the best of area shopping, nightlife and attractions
- Nestled amidst a 35-acre nature preserve

Guest Rooms :

- 448 Luxuriously appointed rooms
- 16 Tower suites with wetbar
- 8 Waterside suites in our Casita Conference Villas
- 40 Guest rooms are available on our bi-level Regency Club. Special amenities are available for the executive traveler.
- All guest rooms feature honor bars

Casitas :

- Located waterside, on the southern tip of the property
- Casita Conference Villas house 48 guest rooms in a relaxed atmosphere
- 8 Conference/hospitality parlors provide a unique setting for social and business functions

Personalized Guest Services :

- Complimentary airport shuttle
- Complimentary golf course shuttle for individual players
- Complimentary shuttle to the Westshore business district
- Full-time Concierge department
- Limousine service available

Meeting Facilities :

- 10,500 Square foot Audubon Ballroom, divisible into 6 sections
- 13 Additional breakout rooms
- Second largest ballroom in Tampa and the largest amount of meeting space in the Westshore area.
- The West end of the Audubon Ballroom and 6 breakout rooms offer superb waterviews.

Recreational Activities :

- Private beach with watersports
- 2 Freeform pools and whirlpools
- Tennis and racquetball courts
- Complete fitness center with aerobics, weight room, sauna and massage therapy
- Deep water channel with boat dock
- Golf privileges at nearby courses

Restaurant/Lounges :

3 Restaurants, 4 Lounges offer a variety of dining and entertainment options

- Seychelles, our rooftop restaurant, offers Northern Italian cuisine and seats 105.
- Oystercatchers, our freestanding seafood restaurant provides seating for 140.
- Le Cafe, located on the lobby level, serves breakfast, lunch and dinner and seats 140.

(800) 228-9000 Hotel (813) 874-1234

One Cow, One Cow, that father bought for two zuzim, One Cow, One Cow,

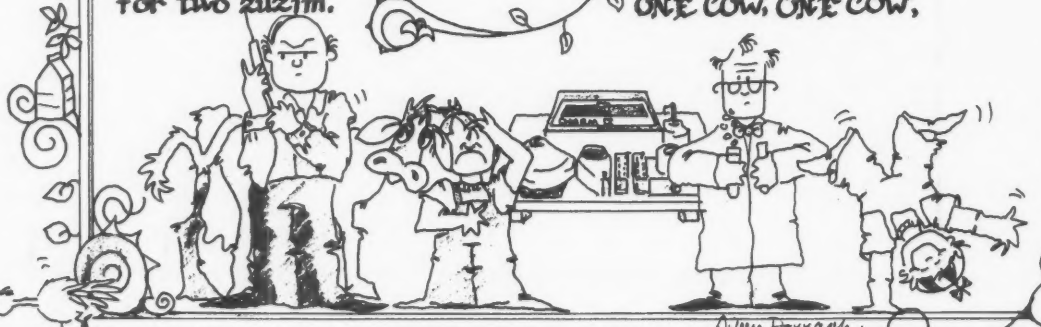
And the bug came
and infected the cow
that father bought
for two zuzim.
ONE COW, ONE COW.

And the tetracycline came
and killed the bug
that infected the cow
that my father bought
for two zuzim.

And the child came
and drank the milk
that contained the tet'
that killed the bug
that infected the cow
that my father bought
for two zuzim.

And the test was needed
to save the child
that drank the milk
that contained the tet'
that killed the bug
that infected the cow
that my father bought
for two zuzim.

And Stanley came
and invented the test
that saved the child
that drank the milk
that contained the tet'
that killed the bug
that infected the cow
that my father bought
for two zuzim.
ONE COW, ONE COW,



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SEE OUR EXHIBIT AT THE IAMFES ANNUAL MEETING

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